THE ROLE OF TASTINGS AND SIMPLE MARKETING TOOLS IN CHILDREN'S ACCEPTANCE OF HEALTHY, PLANT-BASED ENTRÉES

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ABSTRACT

A field study was conducted in four public elementary schools in New York (NY) in order to evaluate the impact of simple, school-based interventions on children's acceptance of healthy, plant-based entrées. In partnership with a nonprofit called the Coalition for Healthy School Food, this study targeted two entrées under the brand of Cool School Food (CSF): Ms. Patel's Rajma ("Rajma") and West African Beans & Greens (WABG). Children's choice, consumption, knowledge and perceptions of CSF are used as indicators of acceptance, with choice or demand being the primary focus.

The interventions were implemented on a school-wide basis and consisted of: samples offered in the lunch line of the weekly CSF special; recipe-specific morning announcements; and recipe-specific posters and signs placed at children's eye-level around the cafeteria and at the lunch line. A differences-in-differences research design is used to identify the interventions' impact on children's acceptance. In this set-up, treatment status is assigned to two schools and control status is assigned to the other two schools. Observational and pre-post survey data is collected in all four schools. The observational dataset consists of 3,319 trays or child-days. Three-hundred ninety-eight students are represented in the survey dataset, 174 of which took both the pre- and post-survey.

The interventions evaluated in this study did not conclusively demonstrate an effect on selection or consumption of Cool School Food as a whole. They were, however, found to clearly and positively impact correlates of demand, like knowledge, taste exposure through sampling and liking among new consumers of CSF, as well as demand

for Rajma upon replication of the interventions. Specifically, the interventions had a positive but statistically insignificant impact on the probability of selecting CSF, increasing it by 5.2%, which is roughly equivalent to an additional 10 CSF meals selected for a school lunch population of 200 students. Taking a closer look, the second round of interventions for Rajma were found to significantly increase the probability of selecting Rajma by 6.5%. The interventions were also found to significantly increase the probability of affirmatively knowing what CSF, Rajma, and WABG is by 39.4%, 42.8% and 32.4%, respectively. There is moreover evidence that the interventions led more students to try CSF and improved attitudes toward CSF among those who had not tried it prior to the study. Specifically, the interventions increased the probability of sampling Rajma and WABG during the intervention period by 29.5% and 25.5%, respectively. There are consistently strong entrée effects on the various indicators of acceptance used.

These findings suggest that the effectiveness of simple marketing tools like tastings, recipe-specific announcements, and posters and signs may depend on the entrée targeted and the number of replications of the interventions, which may produce larger and more pronounced effects if sustained over time. All in all, the interventions evaluated show promise for future use and study, and this research contributes to our understanding of children's acceptance of healthy, plant-based entrées. The acceptance of these kinds of foods will shape what kind of role their increased consumption can have in improving human and environmental health, as well as whether they can have a role at all.

BIOGRAPHICAL SKETCH

Anjali Urvashi Narang received her Bachelor of Science in International Relations and Environmental Studies at Tufts University in Boston, Massachusetts in 2013. She anticipates receiving her Master of Science at the Charles H. Dyson School of Applied Economics & Management at Cornell University in Ithaca, New York in 2018. She looks forward to continuing her doctoral studies that same year at Cornell's Dyson School, where she expects to further develop her interests in behavioral, food and environmental economics.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1

1 Introduction

Diet-related problems among children in the United States (US) have reached alarming rates, with one in three children being overweight or obese and at increased risk of type 2 diabetes or heart disease (Fryar, Carroll, and Ogden 2014). The National School Lunch Program (NSLP) and other child nutrition programs offer multiple opportunities to encourage food choices that align with health (Larson & Story, 2009; Mancino & Guthrie, 2009), environmental and social outcomes in school settings. In fact, it is estimated that school meals contribute from 19 to 50% of children's caloric intake (Gleason & Suitor, 2008). School meals may have even more significant health implications for low-income students, for whom school meals serve as a primary food source (Schwartz, Just, Chriqui, & Ammerman, 2017). Further highlighting the importance of healthy eating at school, evidence suggests that diet has a role in educational outcomes such as standardized test scores and absenteeism (Belot & James, 2011).

Efforts to increase the availability of plant-based meals at schools have emerged amidst these health and other concerns. A legislative resolution for NY State passed unanimously on March 24, 2004 stating that public schools should provide a healthy, vegetarian entrée as an option every day, as well as nutrition education that includes information about healthy, multicultural, vegetarian eating options (New York Senate, 2004). This resolution was based on the "Unified Dietary Guidelines" of the American Academy of Pediatrics, the American Cancer Society, the American Heart Association

and the National Institutes of Health, as well as the USDA's Dietary Guidelines, which recommend that a majority of one's diet be sourced from plant-based foods. This resolution was also motivated by the relatively high percentage of overweight or obese children in NY compared to the nation, which is about fifty in New York City and more than twenty-five in NY State. Being overweight or obese implies a higher risk of health problems like heart disease, diabetes, asthma and cancer, which the resolution states can be reduced by diets rich in fruits, vegetables, whole grains and legumes. Such diets, it states, could also reduce the risk of other diet-related chronic diseases and generally promote good health. The resolution adds to the list of reasons for increasing the number of vegetarian options offered at school that a growing number of schoolchildren in NY are vegetarian or vegan or follow diets that are not readily accommodated by existing menus.

The rising demand of plant-based meals at school is visible in the spread of Meatless Mondays to 230 schools in the US (Meatless Monday K-12, 2018) and the integration of plant-based meal options in school menus. Schools featured in the news for offering regular plant-based options or entirely vegetarian or vegan menus include a vegan preschool in Jersey City, a vegan kindergarten in Milan, two vegan K-12 schools in Southern California and upstate NY and three entirely vegetarian elementary schools in New York City, where there are also 1,200 public schools that offer a daily vegan hummus option (Ettinger, 2016; "Stirring up interest," 2018; Taylor, 2018). More than three dozen schools in Los Angeles also have plans to serve ten daily rotating vegan options and 435 lunchrooms in four municipalities in Brazil have plans to become entirely

plant-based by the end of 2019 (Humane Society International, 2018; "Stirring up interest," 2018; Taylor, 2018).

In addition to health concerns, environmental concerns are commonly cited reasons for these events. Plant-based diets are claimed to have smaller environmental footprints than conventional diets and also to have a significant role in combating climate change. The Food and Agriculture Organization of the United Nations (FAO), for example, has reported that global livestock emissions account for 14.5% of all anthropogenic greenhouse gas emissions (FAO, 2013). Among other reasons schools have increased access to plant-based foods are potential improvements in animal welfare and cost savings. It is important to point out that, despite the touted benefits of plant-based diets, a debate about their sustainability on environmental and health fronts remains. It is less clear, for example, whether a worldwide shift to a 100% plant-based diet is more efficient than other diets when considering the lower energy density of plant-based foods and the land use changes that might accompany a shift to plant-based agriculture (Dairy Nutrition, 2008; Lang, 2007; Purdy, 2016). There are also concerns that plant-based diets could result in nutritional deficiencies (Dairy Nutrition, 2008).

The Coalition for Healthy School Food (CHSF) is a nonprofit organization that was founded to implement NY's legislative resolution to expand plant-based meal offerings at school. In partnership with the CHSF, a field study was conducted in four public elementary schools in NY in order to evaluate the impact of simple, school-based interventions on children's acceptance of healthy, plant-based entrées. Children's choice, consumption, knowledge and perceptions of CSF are used as indicators of acceptance, with choice or demand being the primary focus. This study targets entrées offered through

CHSF's Cool School Food (CSF) program. In addition to being healthy and plant-based, CSF entrées are homemade and internationally-inspired. They are offered in school during lunch and generally feature beans or tofu.[1]

CSF entrées, however, suffer low selection rates relative to the most popular entrées, rates lower than hoped by informal stakeholders (Baker, 2015). One reason for this is that sustained promotional campaigns for CSF recipes are currently lacking. While healthy eating requires the existence of healthy food choices, the creation of these choices may not lead to healthier eating alone. Promotion may be additionally needed and may be particularly important for dishes that are unfamiliar to children, like those under the CSF program. Based on international cuisines and plant-based sources of protein like beans, these entrées feature ingredients and preparations that are likely unfamiliar to many children. By promoting CSF entrées, the interventions evaluated in this paper contribute to our understanding of tools that can be used to foster and reinforce healthy eating habits at school.

This study showcases tools that are low-cost, easily implementable and grounded on marketing and behavioral economics principles. Implemented on a school-wide basis, these tools are: samples offered in the lunch line of the weekly CSF special; recipe-specific morning announcements; and recipe-specific posters and signs placed at children's eye-level around the cafeteria and at the lunch line. A differences-in-differences research design is used to identify the treatment effect on knowledge, attitudinal and behavioral outcomes related to the consumption of CSF. In this set-up,

[1] In line with the 2004 resolution NY State passed, the CSF program is also a Farm to School Program that incorporates local, organic beans when possible (Coalition for Healthy School Food, 2018).

outcomes are compared before and after the interventions are implemented between a treatment group of two schools and a control group of two other schools within the same school district. Two CSF entrées are studied: Ms. Patel's Rajma ("Rajma") and West African Beans & Greens (WABG). Rajma is an Indian kidney bean curry dish and WABG consists of pinto beans, kale, and sweet potatoes. They are both served over brown rice. Like all CSF entrées, Rajma and WABG are reimbursable under NSLP and meet the USDA's nutritional requirements for meals under this program. See Illustration 1 below for photos of Rajma and WABG.

Illustration 1. Photos of Ms. Patel's Rajma and West African Beans & Greens

* Ms. Patel's Rajma is on the left and West African Beans & Greens is on the right. These are black-and-white versions of photos taken from the Facebook page of the school district's food service program.

The main objectives of the interventions implemented and evaluated in this study are to: (1) increase knowledge about CSF and its availability as an option at lunch; (2) encourage elementary schoolchildren to try CSF; and (3) ultimately, increase demand of CSF entrées during school lunch. Compared with previous studies on taste exposure, the *primary* objective of the tastings in this study is relatively novel. Here, in-line tastings are used as a means to primarily increase *demand*. Previous studies have used tastings or taste tests for menu development (Snelling et al., 2017) or as a measurement tool used to *gauge* willingness to try and liking of vegetables (Bellows et al., 2015; Morris, Neustadter and Zidenberg-Cherr, 2001). Previous studies have also used tastings or taste tests to *increase* liking of previously disliked foods (Lakkakula, Geaghan, Zanovec, Pierce, & Tuuri, 2010; Lakkakula et al., 2011), or to increase vegetable consumption (Snelling et al., 2017). While these latter two objectives are also objectives in this study, they are of secondary focus.

This study also is relatively novel in its focus on entrées rather than fruits and vegetables, which are usually the target of school lunch studies. As generally the largest component of the school meal, delivering a significant source of calories and nutrients, entrées are also important to study. They are furthermore important to study because they face distinct promotional challenges relative to fruits and vegetables. While students can take as many fruits and vegetables as they want, they are limited to one entrée, at least in the school district of interest.[2] Thus, unlike fruits and vegetables, choosing CSF requires

[2] Students must take at least a half cup of serving of fruits and vegetables for their meal to be reimbursable under the NSLP (US Department of Agriculture, Food and Nutrition Service, 2018)[2]. One study found that this requirement increased the number of children eating fruits or vegetables by about 8% (Just and Price, 2013a). It increased waste by 70%, or about a fourth of serving per meal per child. These findings are also consistent

substituting away from another food item. In sum, this study's contribution to the literature on healthy eating in school is in not only in its evaluation of an underused tool to meet an under-evaluated objective but also in its focus on an under-targeted component of the school meal.

Observational data and pre-post survey data were collected to test key hypotheses of interest. While the collection of a pre-post survey (e.g. Heim, Stang, & Ireland, 2009; Medina, Giampaoli, Goto, Hart, & Bianco, 2017) and observational data in the school lunchroom is common, their combined use is also relatively unique to this study. Here, both stated-preference and revealed-preference methods are used to obtain a more nuanced understanding of children's acceptance of CSF. Specifically, observational data is used to test hypotheses H1 and H2 and pre-post survey data is used to test H3 to H5, described below.

- H1 ("Increased Demand"): The interventions increased demand of CSF entrées during school lunch. Reflecting the main goal of the interventions, the primary demand indicator is CSF selection as a whole. Secondary indicators include entrée-specific selection of CSF, i.e. Rajma and WABG selection. Based on the literature on repeat exposure that suggests that acceptance requires multiple exposures to the target food, an ancillary hypothesis is that the second round of interventions increased demand of Rajma more than the first round. This

with Amin, Yon, Taylor, and Johnson (2015)'s research on the impact of the NSLP on fruit and vegetable selection, consumption and waste.

hypothesis is only testable with Rajma since Rajma was offered twice in the intervention period, whereas WABG was offered only once in this period.

- H2 ("Increased Consumption"): The interventions increased consumption, or food intake, of CSF entrées among those children who selected CSF. It is important to note that the relatively low demand for CSF is thought to be chiefly driven by lack of exposure. Thus, the interventions are aimed at increasing the number of people who consume CSF, rather than the quantity of CSF consumed among existing consumers. In other words, the interventions are focused on increasing the extensive margin of consumption, rather than the intensive margin of consumption. Consumption data is collected because consumption is an important metric to track; the nutritional value of these entrées cannot be realized without their consumption. The primary consumption indicator is CSF consumption. Secondary indicators include entrée-specific consumption, i.e. Rajma and WABG consumption.
- H3 ("Increased Knowledge"): The interventions increased knowledge of CSF, Rajma and WABG. This is based on the idea, supported by anecdotal evidence and a formal evaluation of the CSF program (Baker, 2015), that the lack of knowledge of and familiarity with CSF and the ingredients in its recipes hinder CSF's popularity.
- H4 ("Improved Attitudes"): The interventions improved attitudes toward CSF. Main indicators of improved attitudes include: increased reports of "liking" or "loving" CSF, Rajma or WABG among those who had tried each item, as well as those who had not tried each item; improved perceptions that students' peers

"like" or "love" CSF; and improved perceptions of the healthfulness of CSF, i.e. that CSF is "good" or "really good" for the respondent. Whether attitudes toward beans improved is also assessed since CSF recipes are bean-based. Improved attitudes toward beans is indicated by increased reports of "liking" or "loving" beans.

- H5 ("Increased Sampling"): The interventions encouraged elementary schoolchildren to sample Rajma or WABG. Sampling indicates willingness to try or taste CSF.

The intimate relationships between these hypotheses and the objectives they represent must be emphasized. Increased knowledge (H3, objective 1) and increased sampling (H5, objective 2), while ends in themselves, are also intended as means of achieving the ultimate goal of increasing demand for CSF (H1, objective 3). Increased knowledge (H3, objective 1) may also contribute to increased sampling (H5, objective 2). According to revealed preference theory that states that choice reveals preference ordering, increased liking (H4) should also be positively associated with increased demand (H1). There is lastly also empirical evidence linking liking (H4) and consumption (H2) (Domel et al., 1996; Heim et al., 2009; Resnicow et al. 1997) and factors of consumption (Kaiser et al., 2012).

The evidence from this study supports H3 ("Increased Knowledge") and H5 ("Increased Sampling"), partially supports H1("Increased Demand") and H4 ("Improved Attitudes") and does not support H2 ("Increased Consumption"). The interventions increased the probability of selecting CSF by 5.2%, roughly equivalent to an additional

10 CSF meals selected for a school lunch population of 200 students. This increase, however, is not statistically significant. Taking a closer look, the second round of interventions for Rajma significantly increased the probability of selecting Rajma by 6.5%. The interventions also significantly increased the probability of affirmatively knowing what CSF, Rajma, and WABG is by 39.4%, 42.8% and 32.4%, respectively. There is moreover evidence that interventions significantly increased liking of CSF and Rajma among those who had not tried CSF. The interventions did not significantly increase liking among those who already had tried beans, CSF, Rajma or WABG. Neither did they lead students to believe that CSF is healthy. Finally, the interventions increased the probability of sampling Rajma and WABG during the intervention period by 29.5% and 25.5%, respectively. All in all, the interventions in this study clearly and positively impacted correlates of demand, like knowledge, taste exposure through sampling and liking among new consumers of CSF, as well as demand for Rajma upon replication of the interventions. There are consistently strong entrée effects on the various indicators of acceptance used. These findings suggest that the effectiveness of the interventions may depend on the entrée targeted and the number of replications of the interventions, which may produce larger and more pronounced effects if sustained over time.

CHAPTER 2

2 Literature Review

The interventions were chosen based on existing literature on health interventions, first-hand observations made in cafeterias in the school district and anecdotal evidence of the success of the previous CSF in-line tasting. This section will focus on relevant literature, while the observations and anecdotal evidence will be discussed later in the Methods section.

Broadly-speaking, literature has highlighted the importance of behavioral factors and behavioral economics principles in food consumption, showing that small changes in the food environment can have proportionally large effects on behavior. The Smarter Lunchrooms Movement (2018) has identified low-cost strategies based on evidence from the fields of economics, marketing and psychology to nudge students to make healthy choices in school lunchrooms. The three interventions – tastings, recipe-specific morning announcements and recipe-specific posters and signage – implemented in this study are among the strategies the Smarter Lunchrooms Movement has identified. It advocates for taste tests of new foods as means to experience the sensory properties of food, such as smell, texture and flavor. It advocates for vegetable taste tests as means of enabling children to try vegetables without the commitment of selecting a full serving and facilitating the development of preference through repeat exposure. The Smarter Lunchrooms Movement also advocates for the use of announcements to prime appetites and enhance taste expectations. There is evidence that positive messaging, delivered through morning announcements, for example, can increase willingness to try a novel

vegetable (Gibson et al., 2012). However, the impact of positive messaging may depend on specific food characteristics, possibly working in the opposite direction of what is desired if the messaging produces suspicion. Lastly, the Smarter Lunchrooms Movements also promotes the use of age-appropriate and easily readable signage in high-traffic areas as a means of suggestive selling.

Others have also supported the use of each of the three interventions of study. Bellows et al. (2015) state that tastings, the central intervention, are an underused, potentially promising and relatively inexpensive promotional strategy for increasing children's familiarity with healthy, novel foods in schools, which are often limited in resources. Tastings can provide opportunities for adult and peer influence to interact beneficially. They also align with the joint statement of the American Dietetic Association, School Nutrition Association and Society for Nutrition Education that nutrition education efforts should integrate both cafeteria and classroom activities[3] (Bellows et al., 2015).

The primary mechanism by which tastings are expected to have an effect is by increasing exposure. Repeat exposure, by increasing familiarity, has been cited as an important determinant of food acceptance (Albuquerque et al., 2018; Cooke, 2007; Dovey, Staples, Gibson, & Halford, 2008; Gibson et al., 2012; Lafraire, Rioux, Giboreau, & Picard, 2016; Wardle & Cooke, 2008). Familiarity includes familiarity with sensory properties of food, which in turn can reduce neophobic reactions and increase positive reactions to unfamiliar foods (Albuquerque et al., 2018; Aldridge, Dovey, & Halford,

[3] The settings of tastings and taste-tests have varied. Some are classroom-based and others, like in this study, are cafeteria-based. At least one took place in a farm stand.

2009; Dovey et al., 2008). Neophobia is the reluctance to eat or avoidance of new foods (Dovey et al., 2008). The role of sensory properties in children's liking of particular foods is evident, for example, in a study on school meal acceptance that found that the best liked main dishes were recognizable by appearance, odor and flavor and were bright and colorful (Tuorila, Palmujoki, Kytö, Törnwall, & Vehkalahti, 2015). In particular, visual cues may explain many of children's food rejections (Dovey et al., 2008; Lafraire et al., 2016; Maratos & Staples, 2015). Maratos and Staples (2015), for example, found that visual attentional biases in neophobic children were higher toward unfamiliar fruits and vegetables and inversely related to their willingness to try them. The experience of pleasurable sensations when consuming food might partly explain children's preference for hedonic foods (Aldridge et al., 2009; Marty, Chambaron, Nicklaus, & Monnery-Patris, 2018), including sweet, salty and energy-dense food (Wardle & Cooke, 2008), and their dislike of bitter-tasting foods, like certain vegetables (Dovey et al., 2008; Gibson et al., 2012; Wardle & Cooke, 2008). In addition to the sensory dimension, Marty et al. (2018) attribute pleasure from eating learned in childhood to interpersonal or social and psychosocial factors.

Though the role of repeat exposure in food acceptance is well-researched, there is not a universally-applicable number of exposures after which acceptance can be said to certainly occur. The number of exposures required for food acceptance might depend on the characteristics of the specific food in question or the time elapsed between exposures, with the maximum effect possibly occurring after a delay (Cooke, 2007). On one hand, the number of exposures required for preference change or increased intake seems to differ by age, with infants possibly only requiring one taste of a new food, two-year olds

possibly requiring five to ten exposures, three- to four-year olds requiring eight to 15, and eight- to 12-year olds requiring from eight to twenty exposures or possibly more (Cooke, 2007; Lakkakula et al., 2010). Of relevance, over ten exposures were found to increase reported liking of lentils, an important plant-based source of protein that is also featured in other CSF recipes, among children ages three to six (Ramsay et al. 2017). On the other hand, it is not clear how much age influences the number of exposures required. For example, Anzman-Frasca, Savage, Marini, Fisher, and Birch, 2012 found that six exposures were sufficient for inducing liking among three- to six-year olds and that this liking was maintained till the eighth exposure; this number of exposures is lower than the aforementioned number for this age group. Lakkakula et al. (2010) and Lakkukula et al. (2011) seem to find less variable numbers. Both studies found that eight or nine exposures were sufficient to improve liking even when the age group or frequency of exposure varied. Lakkakula et al. (2010) presented tastings of a previously disliked vegetable once a week for ten weeks, studying low-income fourth and fifth graders who tasted each fruit or vegetable at least eight times. They found that eight or nine exposures resulted in the greatest number of children reporting liking of the vegetable. Lakkukula et al. (2011) presented tastings twice a week every other week for a total of eight weeks. They found that eight exposures increased liking of a previously disliked fruit or vegetable among low-income first, third and fifth graders. Other factors that may influence the role repeat exposure plays in food acceptance should be researched to foster a more dynamic understanding of the relationship.

One reason for studying the impact of exposure on liking is that research shows preference, or liking, to be an important predictor of consumption (Domel et al., 1996;

Heim et al., 2009; Resnicow et al. 1997), or factors of consumption, like willingness to try the food again and willingness to ask for the food at home (Kaiser et al., 2012). For example, at least two studies found that fruit and vegetable preference was the strongest predictor of fruit and vegetable intake in children when compared with self-efficacy, outcome expectations, social norms, asking skills and knowledge (Domel et al., 1996; Resnicow et al. 1997). Exposure to *varied* foods may also contribute to new food acceptance because children seem to prefer variety (Albuquerque et al., 2018; Cooke, 2007). Nevertheless, Aldridge et al. (2009) caution that "children will eat the foods they prefer, but preferences to all foods are learned through experience, so these need not be narrow choices leading to unhealthy preferences." In other words, preference can lead to consumption, but preferences are not unmovable; otherwise, exposure could not increase liking of previously disliked foods. There is also evidence suggesting that preference need not even predicate consumption. Hoffman, Franko, Thompson, Power, & Stallings (2010) found that fruit and vegetable consumption during school lunch increased without concurrent increases in preferences for fruits and vegetables, suggesting that behavioral factors might additionally be at play.

Studies comparing different factors' influence on food preferences and consumption behavior also suggest that exposure is a dominant factor among other potential factors like information or messaging. Wardle et al. (2003a) found that an exposure-based intervention led by parents at home increased children's (ages two to six) liking, ranking and consumption of a previously disliked vegetable, while an information-based intervention had no statistically significant impact. Parents in this study gave their child a taste of this vegetable every day for two weeks. Similarly, Ramsay et al. (2017)

found that the addition of a child centered nutrition messaging to an exposure-based intervention did not have a statistically significant effect on liking in later periods, though the effect was significant in the earlier periods. Among children aged three to six years, another study likewise found that the increase in children's liking of a previously disliked vegetable was driven by repeat exposure rather than associative conditioning in which vegetables were paired with a liked dip (Anzman-Frasca et al., 2012).

The evidence on tastings' effectiveness on consumption-related outcomes is not unwavering. Medina et al. (2017) found that recipe taste tests, along with cooking demonstrations offered through four bi-monthly farm stands in a food desert in the western US were not significantly associated with changes in fruit and vegetable preferences, self-efficacy and at-home availability among low-income fourth to eighth graders. O'Connell, Henderson, Luedicke, and Schwartz (2012) found that repeat exposure did not increase vegetable consumption and that vegetable consumption fluctuated on a daily basis. While exposure produced a consistently positive effect on short-term liking, exposure alone may not produce longer-term changes in consumption. A study among kindergarteners and first-graders (ages four to six) comparing three intervention groups – exposure plus tangible reward, exposure plus social reward (i.e., praise) and exposure alone – found that exposure was effective in increasing liking and consumption of a target vegetable and may have even been the primary driver of increased liking. However, effects on consumption for the exposure-alone group seemed to dissipate over time, while the effects of the other two groups remained (Wardle et al., 2003b).

Studies formally evaluating visual marketing materials similar to the posters and

signs in the study at hand include those focusing on media content (Hanks, Just & Brumberg, 2016) and the location of media (Nicklas, Johnson, Myers, Farris, & Cunningham, 1998). A study assessing the impact of branded media on vegetable uptake among low-income elementary schoolchildren in a large urban school district found that branded media increased vegetable and salad uptake (Hanks, Just, & Brumberg, 2016). In Hanks et al.'s study, branded media treatments comprised of vinyl banners printed with branded vegetable characters, television segments that featured these characters delivering health education messages or a combination of both. The researchers note that the combination treatment effect may be mostly driven by exposure to the vinyl banner, even though banners or television segments alone were not associated with statistically significant increases. While the characters on the posters and signs displayed of CSF are not branded in the sense that they are not featured in other CSF promotional materials, the effective use of cartoon characters in the vinyl banners may support the continued use of cartoon representations in the CSF posters.

The placement of bright, colorful posters and signs of Cool School dishes at eye-level is supported by a study in which the visibility and convenience of healthier food and beverage items were manipulated at a hospital in Boston (Thorndike et al., 2012). Sales of healthy beverages and food items, here, bottled water and pre-made sandwiches, increased as a result of this manipulation, and sales of unhealthy items decreased. The effects were particularly large for bottled water. Qualitative evidence from the school district at hand also supports such placement. The food service director similarly stated in an interview that the relocation of vegetable options and bean burritos improved their selection significantly, though this change was also accompanied by a name change of

the burritos.[4]

The discussion thus far has mostly focused on studies evaluating the impact of a single intervention. However, there is also a swath of evidence from studies of multi-component interventions supporting the use of the three interventions in combined use with each other or different interventions. Perhaps most similar to the present study in the interventions selected and the logic for their selection, a longitudinal, multi-component school-based fruit and vegetable promotion program included activities like posters in the cafeteria and loudspeaker announcements of an interesting fact about the fruit and vegetable of the day (Hoffman et al., 2010). Other activities included verbal praise and computer programming featuring cartoon characters and similar-aged peers delivering health messages. The announcements were intended to direct students' (kindergarten and first grades) attention to the messages and motivate them to eat fruits and vegetables by regularly raising their profile. The posters featured cartoon characters from the computer program and were placed closed to the cafeteria line to ensure their visibility when students were making their food choices. The posters were also thought to facilitate identification of the location of fruits and vegetables and to remind children to take them. Similar to those elicited in pre-post survey in the study at hand, outcomes included perceptions of the program, reports of hearing the morning announcements and liking the morning announcements. The program was found to have modestly increased fruit consumption, but not vegetable or juice consumption. Results also indicate that almost all, 98%, of children report hearing the announcements, while most, 78%, children report liking them a lot. The study's effects, however, diminished at the end of the second year.

[4] Reference omitted to preserve anonymity of school district.

The Gimme 5 program included among its activities taste-testings of fruits and vegetables and Gimme 5 recipes, point-of-service signs delivering nutritional information of the fruits and vegetables offered via taste-testing, eye-catching posters displayed in high-visibility places and table tents in the cafeteria with messages and information on activities related to the selected fruits and vegetables (Nicklas et al., 1998).[5] Implemented in high schools in New Orleans, Louisiana, the program was found to have increased the daily servings of fruits and vegetables consumed, although this increase was not sustained in the follow-up three years later. Similar to the goals of evaluation in the paper at hand, in addition to behavior changes, knowledge and attitudes changes associated with the program were evaluated through questionnaires conducted at baseline, interim and follow-up. Nicklas et al. found that knowledge and awareness scores increased and that these increases were maintained at interim and follow-up. A nutrition education intervention administered to fourth-graders in Pennsylvania involving tastings, worksheets, handouts and more similarly found that the intervention significantly improved knowledge, attitudes, self-efficacy and preferences, indicators of which were elicited from pre-post surveys (Wall, Least, Gromis, & Lohse, 2011).

Heim et al. (2009) conducted an evaluation of a 12-week garden-based nutrition intervention involving experiential learning activities that included weekly tastings of local fruits and vegetables, preparation of healthful snacks, and distribution of a cookbook with recipes for the fruits and vegetables students tasted and prepared, as well as family

[5] In addition to a schoolwide, media-marketing campaign, the Gimme 5 interventions included classroom activities, school meal modification and parental involvement.

newsletters. Their data suggests that the program was well-accepted and valued by the children (ages eight to 11), and that almost all, 97.8%, of the children enjoyed the tastings. The intervention seemed to also increase the number of fruits and vegetables ever eaten. There was no significant change in exposure to or preference for common vegetables, suggesting that the interventions may be more effective for unfamiliar vegetables. Heim et al. found that relative to the baseline, there was a significant reported increase in vegetable preferences, but no significant increase in fruit preferences, which were high at baseline, as well as snack preferences. There was a significant increase in child asking behavior, but no significant change in self-efficacy[6] and at-home availability of fruit and vegetables, which was also high at baseline and could explain the higher than average exposure to beans. Overall, results seem to imply that the given interventions are more relevant for outcomes with low baseline measurements.

The Cafeteria Power Plus project consisted of monthly samplings of unfamiliar fruits and vegetables served by student helpers at the lunch table, as well as posters hung around the cafeteria of "life-size" fruit and vegetable characters (Perry et al. 2004). The sampled item was offered the next day as an additional choice rather than the same day. Other special events and activities also took place in the cafeteria to increase the availability and attractiveness of fruits and vegetables. Perry et al. found that the interventions provided additional opportunities for students to consume fruit and vegetables, as well as positive role models and social support for increased consumption of fruits and vegetables. Observations of first and third graders during lunch revealed that

[6] Self-efficacy was assessed by asking questions like "How sure are you that you could eat fruit for a snack when you are hungry?"

the project did indeed increase total fruit intake.

At least one study has also explicitly recommended not only the use but also the evaluation of promotional activities similar to the one at hand. Specifically, a process evaluation model of the CATCH Eat School Nutrition Program recommends evaluating: the involvement of students and food service staff in taste-testing activities among many others, the announcement of the menu over the public address system and posters displayed in the food preparation area (Edmundson et al., 1994). Results from the program indicate that the program successfully lowered the total fat and saturated fat content of school lunches as offered (Osganian et al., 1996). In sum, results from single component and multi-component studies suggest that the interventions in question are worth further study.

CHAPTER 3

3 Methods[7]

3.1 Sample

The sample of students in this study came from four public elementary schools located in one school district in NY. The schools were selected among all the public schools in the school district because they were the four most similar schools in terms of racial and income composition. The four schools were further stratified into two groups based on their similarity in racial and income composition once again such that one school within each group was assigned treatment status and the other was assigned control status.[8] The percentage of students eligible for free or reduced price lunch under the NSLP was used as a proxy for income. This proxy is recommended for use when individual-level data is lacking (Day et al., 2016) and has also previously been used in other school studies (Just & Price, 2013b). School-level data on racial and ethnic composition of and free and reduced price lunch eligibility rates in these four schools is publicly available through the NY State Education Department (NYSED) at data.nysed.gov.[9]

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[7] Reported percentages that do not add up to 100% are due to rounding.

[8] One school was pre-determined to be a treatment school because of preexisting interest in collaboration between its principal and the CHSF. Selection bias is unlikely a concern because there is no known reason to believe that the characteristics of the principal are correlated with characteristics of the student population. The assignment of treatment status to the second school was randomly determined via a coin toss.

[9] Please note that all data from NYSED referred to in this paper is for the 2016-7 school-year, but this study was conducted in the 2017-8 school-year. Thus, the data may not be fully representative of the 2017-8 student population. There seems to be a one-year lag between the school-year the data represents and the current school year. 2015-6 data was retrieved before the study started in the summer of 2017 and 2016-7 data was retrieved after it was completed one year later in 2018.

The total student population of all the four schools (control schools = C1, C2; treatment schools, T1, T2) in 2016-7 ranges from 329 to 423 students each (NYSED, 2018). The student population of the four schools is mostly White and higher-income. It has a slightly greater percentage, 59%, of White students compared to the national percentage of White children in 2016, which is 51% (The Kids Count Data Center, 2017). It has a lower percentage of students eligible for free- and reduced-price lunch under the NSLP than the national rate. In 2014-5, about 52% of students in NY State were eligible for free- and reduced-price lunch (NYSED, 2018), exactly the national average of 52% % (US Department of Education, National Center for Education Statistics, Common Core of Data (CCD), 2017), and 39% of the students in the four schools' county were eligible (NYSED, 2018). In 2016-7, 53% and 40% were eligible state-wide and county-wide, respectively (NYSED, 2018). On a school-specific basis, in 2014-5, school C1 was 43% eligible, C2 was 23% eligible, T1 was 30% eligible and T2 was 28% eligible (NYSED, 2018). In 2016-7, school C1 was 42% eligible, C2 was 27% eligible, T1 was 34% eligible and T2 was 36% eligible (NYSED, 2018).

3.2 Context

According to a 2018 Need and Assessment of Child Nutrition of the county in which this study was located ("NACP report"), 28.1 percent of children in the school district are overweight or obese, the same rate as that for the county but less than that for NY State, 34% (Horn, 2017). Parents reported incorporating fruit and vegetable in meals an average of six days per week and consuming fast-food or packaged meals an average

of one day per week. Most meals are reported as consumed as a family. These statistics suggests families in this school district are relatively healthy.

Among the interviewees and survey respondents cited in NACP report, more than half of elementary students in the county rated the health of their school lunch negatively and only 20 percent stated that their school lunch tastes good. In qualitative interviews, students and parents stated that school meals are lacking in variety. Findings from the NACP report indicate that school lunch options generally leave something to be desired for some students. Specifically, students desire tastier, healthier, less processed, higher quality, homemade, creative vegetarian and vegan options, as well as larger portions. Some stakeholders also noticed that foods from diverse cultures and culinary viewpoints improved the taste and appeal of school food. These observations suggest that. as healthy, homemade, internationally-inspired dishes, CSF recipes should be appealing to at least some students.

Findings from the NACP report contrast with Baker's evaluation of the CSF program (2015), in which children who somewhat regularly get lunch at school reported liking getting lunch at school. Reasons include social factors, their favorite foods being offered and being provided the opportunity to eat "fun" foods or foods they otherwise would not be able to eat at home or in a packed lunch. Some students also reported that school lunch exposed them to new foods. One student even attributed novelty as a factor for his choice of school food, choosing "what's new." Novelty be appealing to students if there indeed is not much variety in what's offered. It is possible that the discrepancies in reported perceptions of school lunch are explained by differences in sample; the NACP

report sampled the entire county and Baker sampled just about half the schools within one school district.

In regards to the sociodemographic context of the county, stakeholders in the NACP report reported that disparities in child nutrition in the county primarily occur where socio-economic class, race and household type interact. Using US Census data, the report found that the percentage of Black/African American and Hispanic/Latino households in the county with incomes below the poverty line is disproportionate, which may put them at greater risk for food insecurity. The report also noted low participation in school lunch among students who are not eligible for free- and reduced-price meals, suggesting that school lunch participation and income are positively related. In this school district, 55 percent of lunches served are to students who are eligible for free meals and 7 percent to those eligible for reduced-price meals. 38 percent pay full-price for their meals.

3.3 History of Cool School Food

The proposed hypotheses align with the short-term goals of the CSF program as stated by the previous CSF program evaluation (Baker, 2015). These goals include: exposure to new foods; an increased number of students who try CSF during tastings; higher selection rates at the lunch line; consumption of healthy food; excitement about consuming healthy food; and sharing, cooking, and eating of CSF recipes with families. As an evaluation of some tools the CSF program has already developed and piloted, this study can further inform assessments of the progress the program has made in achieving some of its stated goals.

Rajma was introduced into the school district in 2012 and WABG in 2013. Rajma, however, has been served much more frequently than WABG. This may be partly due to the food service director's perception that Rajma was among the more popular CSF entrées. Production records[10] provided by the central kitchen indicate that Rajma was served eight times during the 2016-7 school year, and WABG was served only once during this same time frame.

Recipe refinement and menu development rather than recipe promotion have been the focus of the CSF program thus far in the school district of study. Tastings have been among the most consistent of the CSF program's promotional activities. During the first three years of the program, taste tests of each new CSF recipe were conducted at every elementary school in the district during every lunch period (Baker, 2015). Ballots during the taste tests indicated that an average of 65-70 percent of students reported liking each recipe.[11] On average, cafeteria managers indicated in Baker's evaluation that they believed taste tests somewhat encourage students to choose CSF items in the lunch line, and that taste tests were the most effective element of the CSF program at the time. Baker concludes that taste tests are a valuable part of the program, but that their influence on CSF uptake in the lunch line might not be strong. It is worth noting that Baker's evaluation was written before in-line tastings were implemented.

[10] Production records provide daily documentation of the type and amount of food produced for reimbursable meals. They are required by the National School Lunch Program and provide information that can be used to determine whether meals served meet federal Child Nutrition requirements. They can also serve as a planning tool.

[11] Coincidentally, the schools in which the most students reported being satisfied with CSF overall were not included in this study. Also coincidentally, one of the schools with students who were the least satisfied is included in this study as a treatment school (T1)

In-line tastings had only been implemented once prior to this study through the CSF program from December 2015 to March 2016. These tastings included tastings of Rajma at one of the schools in this study, T2. During these tastings, the CSF manager at the time took a tally of the number of people who took CSF those days. No other data was collected. The tallies were collected on four different occasions when Rajma was offered, each of which was about a month apart. In line taste-tests were offered during the first two occasions. The third occasion, a verbal prompt was issued during the third occasion reminding students about Rajma and encouraging them to try it. The fourth occasion, a tally was taken without any promotion. Before the first tasting, three plates of Rajma were recorded as taken. During the first tasting event, 25 plates of Rajma were taken. The second occasion 55 plates were taken, although if Rajma hadn't sold out, it could have been higher. The third occasion 43 were taken, and the fourth 34. While the initial increase from prior to the first occasion to the first occasion was sustained through the fourth occasion, the number of plates taken decreased after the tastings were no longer offered. It appears from this data that the in-line tasting was successful. The success of this tasting also led CSF staff to believe that in-line tastings are more effective than tastings offered elsewhere in the cafeteria, as was done in the past. Its long-term impact is unknown but this in-line tasting could explain the baseline popularity for Rajma observed in T2 relative to the other schools included in this study.

CSF signs have been hung at two schools prior to this study, one of which is T2. Baker (2015) noted that some of these signs were high and not visible to all students, and that general CSF, not entrée-specific, signs were hung. Researchers in this study also confirmed this observation. Baker noted that while cafeteria managers may be willing to

use CSF signs, they may not invest the effort in replacing them on a weekly basis. She concludes: “Signs are being used, but not to their desired potential.”

In addition to lunch line signs, the CSF program has piloted morning announcements. The logic articulated in Baker’s evaluation behind the use of signage and announcements is consistent with the logic behind the interventions used in this study: “lunch line signs and morning announcements…were designed so that school personnel, cafeteria managers and school principals respectively, could independently maintain them on an ongoing basis without requiring CSF staff time” (2015). Other activities the CSF program plans to scale up include after school cooking classes and education programs.

3.4 Research Design

In order to test the first two hypotheses, H1 (“Increased Demand”) and H2 (“Increased Consumption”), observational data on individual food choices and food waste using the quarter-waste method was collected during lunch at all four schools. In keeping with the differences-in-differences research design, schools were classified into two groups, a treatment group and a control group. Observation dates were classified into two periods, the baseline period and the intervention period. During the baseline period, baseline data was collected and neither the treatment schools nor the control schools received the interventions. During the intervention period, the treatment schools received the interventions. Rajma was offered twice in the baseline period and twice in the intervention period. WABG was offered once in each period. Researchers in this study were not involved in the introduction of either entrée, which occurred years prior to the

study's commencement. Thus, similar to studies using behavioral economics, this study preserves the existing choice set.

There were six observation dates: three in the baseline period and three in the intervention period, spanning from October to December 2017. All dates were on consecutive Thursdays, excluding holidays, since that is when the target CSF entrées are offered.[12] Data collection procedures were the same in all schools on all dates, and are described later in this section. The number of the observation dates was limited by the timing of the study's approval and researcher availability.

In order to test the last three hypotheses (H3 "Increased Awareness, H4 "Improved Attitudes and H5 Increased Sampling"), pre-post survey data was collected from third and fifth graders in all four schools.[13] The pre-survey was distributed during the study before the interventions began, and the post-survey after the study after the last round of interventions was completed. See Table 1 for a timeline of the study's execution below.

[12] It is worth pointing out that the intervention period began after Thanksgiving. The holiday effect, however, is not expected to confound the treatment effect because CSF dishes are not similar to dishes that are commonly consumed during this holiday.
[13] Fourth graders were excluded by request of the school district because they were taking another survey and the school district's research review committee did not want them to lose more class time.

Table 1. Study Timeline

Period	Dates (2017)	Entrée Offered	Treated?	
			Control Group	Treatment Group
Baseline	26-Oct 2-Nov 16-Nov	West African Beans & Greens Ms. Patel's Rajma (x2) *Pre-survey*	No	No
Intervention	30-Nov 7-Dec 14-Dec	West African Beans & Greens Ms. Patel's Rajma (x2) *Post-survey*	No	Yes

Since the interventions were implemented on a school-wide basis and treatment status was assigned on a school-specific basis, the experimental unit is the school. Observational and survey data, however, was collected on an individual level. Individuals were not tracked over time so each observation date is treated as a different sample and a person may be represented in the observational dataset multiple times. One observation in the dataset represents one tray or one child-day.

3.4.1 The Interventions

The broad thesis that inspires the study of the particular combination of interventions in this analysis is that the lack of knowledge of and familiarity with CSF and the ingredients in its recipes hinder CSF's popularity. This thesis is not only consistent with previous studies and anecdotal evidence, but also Baker (2015)'s program evaluation. Baker states "[m]ost students are largely unaware of CSF options, or disappointed with the quality of CSF entrées and, after trying one from the lunch line, may throw it away without eating or never try it again." Baker additionally noted that students may have difficulty recognizing CSF by name, especially younger ones. Additional details, she noted, may facilitate recognition. Parents also suggested that more children may choose CSF if CSF recipes were renamed to be more informative about their ingredients. The provision of sensory and other forms of information through these interventions addresses the concern that CSF and its ingredients are unfamiliar to students.

The three interventions implemented and evaluated in this study are: in-line tastings of the CSF recipes of the day; morning announcements advertising the CSF

recipes of the day; and recipe-specific posters and signs placed on the way to and around the cafeteria. Implemented simultaneously, the interventions are evaluated as a bundle, not individually. From an economic standpoint, the cost of introducing an additional intervention in this study is low. Due to this and the presumed synergy among these interventions, the interventions are intended as reinforcing complements to each other. The posters, signs and announcements inform and remind the children about CSF and its availability and what it is, facilitating recognition at lunch and possibly reducing neophobia where it exists, while encouraging students to try them. By promoting their taste and benefits, the announcements were also intended to prime and excite students (Gibson et al., 2012; Smarter Lunchrooms Movement, 2018). The tastings, as the primary means of sensory exposure to these entrées, provide the children the opportunity to taste the foods about which they have been alerted through visual and auditory means.

Recipe-specific announcements were made in the morning either by a student or the principal on Wednesday (day-before) and Thursday (day-of) every intervention week of the study. The script for the recipe-specific announcements was modeled after announcements made in the past about CSF. As an example, the day-*before* announcement for WABG was: "Tomorrow is a special treat – West African Beans & Greens! It is the Cool School Food special at lunch! West African Beans & Greens are made with pinto beans, sweet potatoes, kale, and ginger! Your taste buds will dance! I love West African Beans & Greens! Meet me in the cafeteria tomorrow for a taste of Africa!"[14] The day-*of* announcement for WABG was: Today is Thursday – Cool School

[14] The day-*before* announcement for Rajma was: Tomorrow is a special treat – Ms. Patel's Rajma! It is the Cool School Food special at lunch! 'Rajma' is an Indian curry dish made with vegetables, kidney beans, and a thick, delicious sauce cooked with the

Food Day! Cool School Food recipes are plant-powered creations from around the world. They give us lots of energy, help us concentrate and keep us healthy. Want to help the earth? Cool School Food recipes help keep our planet healthy too! Today we are having West African Beans & Greens with pinto beans, kale, and ginger. I love West African Beans & Greens! Have some power food with me, and please let [principal's name] know what you think of the recipe![15]

The posters and signs were designed prior to the study's start. CHSF was responsible for their design. As previously mentioned, posters and signs for Rajma were already being used by at least one school before the study; they, however, were not very noticeable. For this study, posters of each entrée were hung in multiple locations in, around, and on the way to the cafeteria at eye-level. A sign was placed at the lunch line to direct the student's attention to CSF. The posters were hung for WABG first since the WABG was served the first intervention day, and then Rajma the following week in which Rajma was served. Posters and signs for Awesome Bean Burgers, a CSF entrée regularly offered on Tuesdays but not included for evaluation in this study, were also hung. The posters and signs were intended to further remind students about CSF closer to when and where students would have lunch. See Illustration 2 for images of the posters and signs used as part of the interventions.

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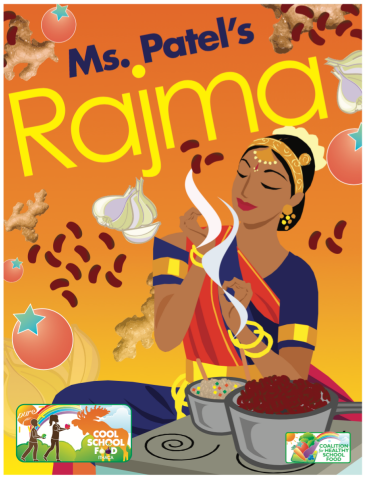
flavors of India. The word RAJMA means 'kidney beans' in India. I'm taking my taste buds to India tomorrow – come along and join me!"

[15] The day-*of* morning announcement for Rajma was: "Today is Thursday – Cool School Food Day! Cool School Food recipes are plant-powered creations from around the world. They give us lots of energy, help us concentrate and keep us healthy. Want to help the earth? Cool School Food recipes help keep our planet healthy too! Today we are having Ms. Patel's Rajma with vegetables, kidney beans, and a tasty sauce. This is one of my favorites! I hope you'll join me today in trying some rajma, and please let know [principal's name] what you think!"

Illustration 2. Posters and Signs Used



The tastings were administered to students while they were waiting in the lunch line. They were not limited to students getting school lunch; anybody could take them. Once all grades passed through the lunch line, the tasting cart was taken to the cafeteria. CSF recipes were also handed out during lunch on the first intervention day for each entrée. During the first intervention day for the entire study, October 26, a packet was handed out with a short explanation of the program, followed by a recipe of Awesome Bean Burgers, and then a recipe of the CSF entrée-of-the day, which was WABG. The second intervention day, the packet only included the Rajma recipe.

While fruit and vegetable consumption was not the focus of this study, fruits and vegetables were also served in brightly colored containers to increase their salience and enhance their visual appeal.

3.4.2 Description of Data Collection Procedures

Observational data was recorded on paper data sheets while survey data was collected electronically through Qualtrics, an online survey platform. Protocols were based on Smarter Lunchrooms materials, including the Ohio and Montana Smarter Lunchrooms Protocols (Ajie, 2018; Ohio Smarter Lunchrooms, 2018; Montana State University and Montana Team Nutrition, 2018).

A regular team of research assistants was stationed at each school, with each team being assigned one person to lead the others. Research assistants were mostly students, a mix of undergraduates and graduate students. There were fifteen regular research assistants, defined as assistants who participated in at least four of the six observation dates. Non-regulars filled in when regulars were absent or when additional assistance was

needed during the intervention period to prepare and provide tastings, and distribute recipes. In total, twenty-nine people assisted with either data collection or tastings or both at least one observation date. A primary reason for the size of this labor pool is that scheduling constraints required data collection to take place at each school simultaneously. Prior to the first official observation date, research assistants practiced collecting data at two schools to get a sense of the process and to familiarize themselves with the elementary school lunch environment. They then participated in a three-hour training session and a trial run, in which the data collection procedures were formally tested and then refined. Regular meetings were also held through the semester of Fall 2017. Students received academic credit for their assistance.

By observation, data on food selection, or food choices, and food waste was collected during lunch in the cafeteria. Waste, i.e. how much was leftover of each food item that was selected, was recorded using the quarter-waste method. The quarter-waste method is a visual inspection method in which waste is measured in quarter-serving increments (e.g. 0, 1/4, ½, ¾, 1, …). A study comparing the quarter-waste method to other food waste data collection methods like the half-waste method and digital photography found the quarter-waste method to be the next most accurate method after weighing (Hanks, Wansink, & Just, 2014; Hoy, Hanks, Just, & Wansink, 2013). Consumption is calculated as servings selected minus servings wasted.

All four schools offer the same core menu of items which are available every day, a function of being located in the same school district and the fact that food production is centralized in this district. This core menu includes the following entrées: bagel with cream cheese, bagel with melted cheese, peanut and jelly sandwich, cold cut sandwich

and yogurt and crackers. Two other entrées vary on a daily basis, although there is some week-to-week regularity in their offerings. Since CSF is being studied, one of these two varying entrées is a CSF entrée.[16] The other varying entrée, for the entire study's duration, is grilled cheese.[17] Regular sides include at least one fruit, at least one vegetable and boiled egg in some schools. Depending on the day and school, vegetables are sometimes cooked, sometimes served pre-portioned and sometimes served in a salad bar. Raw vegetables are always offered. Tomato soup was offered on all observation dates of this study. Beverages include apple juice, orange juice, whole milk, and 1% milk. Children are allowed unlimited fruits and vegetables, sides and beverages. They are limited to one entrée, although enforcement varies. Sources of variation in food offerings across schools primarily arise from leftovers of food items served on previous days.

CSF entrées usually vary on a weekly basis, though certain entrées are offered more frequently than others. The food service director and the Executive Director of CHSF were flexible enough to limit the variation of CSF entrée offerings to two entrées for the purposes of the study. Studying one or two entrées was preferable because the treatment effect may differ by entrée. The food service director determined which CSF entrées would be included in the study.

Selection data was collected at the lunch line and waste data was collected near the garbage bins. Since selection and waste data were collected at different locations, trays were labeled with numbers such that the selection and waste data could be later

[16] Awesome Bean Burgers is offered on Tuesdays. Occasionally CSF is served on other days as well.

[17] Initially, the other varying entrée was going to alternate between grilled cheese and another dish, but an excess supply of cheese made it was more practicable to offer grilled cheese throughout the study.

matched to a particular individual. The tray labeling process was modeled after a school lunch study in two middle schools in Texas (Connors & Bednar, 2015). Both selection and waste data was collected to correct potential errors made from guesswork as to what was selected when recording waste.[18] Discrepancies between items selected and items wasted were resolved post-data collection by recording all food items selected or wasted as selected.[19] If the discrepancies were between items with similar-looking waste remains, it was assumed that the items recorded as selected were correct. Most of these discrepancies arose among sandwiches and bagels.[20]

Other challenges in making accurate waste measurements were noted, though their pervasiveness is not known. At times, a child was designated by other children as responsible for disposing their trash, resulting in a tray that would include several students' trash. Waste from these trays was not recorded. Students may also get additional servings or different items after passing through the lunch line. This may explain some

[18] Past studies pre-portioned fruits and vegetables in containers that could facilitate identification of the food item later at the garbage bins (Just et al., 2012; Just & Price, 2013b). This mitigates the need for selection data, especially when waste not selection was the primary outcome. In the context of the study at hand, various stakeholders were concerned that the containers would cause additional waste. The containers would have also had to been compostable to be accommodated by the school district's disposal system. It is possible that pre-portioning, through portion size effects, may unintentionally affect selection and consumption behavior for food items that are not regularly pre-portioned. See discussion on serving size in main text for references on portion size.

[19] For example, if an apple is recorded as wasted but no apple is recoded as selected, then an apple is also recorded as selected.

[20] For example, a grilled cheese might have been recorded as selected for a particular tray, but a bagel with melted cheese is recorded as half wasted, with no additional records of grilled cheese being wasted for that tray. Since grilled cheese and bagel with melted cheese have similar-looking remains, the waste data for bagel with melted cheese is transferred to that of grilled cheese; in other words, the waste records would show grilled cheese as half wasted and nothing for bagel with melted cheese.

of the discrepancies between items selected and wasted. Students may also share food with other students and save food for later. Sharing and saving food, however, are not expected to be concerns in the measurement of CSF waste since CSF entrées, consisting of beans and rice, are more difficult to share and store at school.

Observational data on grade, gender and race was also collected, in line with studies with comparable data collection procedures (Baker, 2015; Just & Price, 2013b). These characteristics are the most basic demographic characteristics that could be made by observation. The following racial and ethnic descriptors were used to record the observational data: White, Black/African-American, Asian, South Asian, Hispanic, Other and Unknown. While racial data in the survey was self-reported, the racial data used to analyze selection and food waste is subject to measurement error because it is made by observation and without verification. Due to lack of sufficient data in all the listed racial and ethnic categories and the possibility of measurement error, the racial and ethnic categories used for analysis are broader, consisting of: White, Black/African-American, Asian and Other. While observational data may not accurately reflect the actual demographic composition of the population of students who eat school lunch, Tables 2 through 4 can be used to determine the representativeness of the observational dataset, as well as the representativeness of the population of CSF consumers of the dataset or the entire relevant school population.

The international inspiration of CSF recipes may make race in particular a relevant factor in the various outcomes studied in this paper. CSF recipes may be more familiar to children of certain racial and ethnic backgrounds (Baker, 2015). Specifically, since both the dishes studied feature beans and rice, one may expect children who

consume beans and rice at home, such as children from families from South Asia or Latin America, to be more willing to try them. Just as dietary preferences may vary across race and ethnicity (Patrick & Nicklas, 2005), dietary preferences may also vary across income (Larson & Story, 2009; Rasmussen et al., 2006). However, individual-level data on income was not collected in this study. To the extent that race and income interact, as may the case within the county in which the study was located (NACP Report, Horn, 2017), income effects cannot be isolated from race effects.

Data on lunch period duration, food items offered and serving size of food items offered was also collected. Information about the data collection procedures and the cafeteria environment was also recorded. The data sheets used are available in Appendix C. Data on lunch period duration was collected in real-time if possible. Otherwise, lunch period duration was based on the lunch period schedule. Serving size was measured by randomly weighing three items of the same food in grams and averaging their weights. CSF serving size was thus day- and school-specific and CSF serving size was measured almost every day at every school. When serving size not measured, serving size for that particular school-day was imputed with the average for that school.

One strength of the procedure used to collect observational data is that it permits data collection on a large sample. Almost all of the population of students that participate in school lunch on these days should have been observed. Obtaining data on both CSF consumers and non-consumers in a minimally intrusive manner should have hindered students from guessing the exact purpose of this study and altering their behavior in response. Collecting data on both CSF consumers and non-consumers should also mitigate selection bias and enable a more precise inference of which characteristics,

among race, gender, and grade, predispose students to select or consume CSF relative to a process in which only data on CSF consumers is collected. On the other hand, as mentioned previously, the disadvantage to the data collection process undertaken is that it is labor-intensive. Data collected by observation is also potentially prone to error and makes it difficult to collect detailed individual-level data.

The pre-post survey was conducted to provide a slightly deeper understanding of the student population's food habits and preferences than that provided by observation and to obtain a more comprehensive understanding of the intervention's impact. The survey was administered by teachers during the school day through Qualtrics, an online survey software, to third and fifth graders. A copy of the post-survey as viewed from the Qualtrics platform is presented in Appendix E, along with instructions provided to teachers regarding distribution. Surveys were designed in keeping with guidelines for surveying children, which include surveying children no younger than seven (Borgers, de Leeuw, & Hox, 2000). The survey was designed to take on average less than 15 minutes. It was informally tested with students at a farmer's market at another elementary school in the same school district but not included in this study to gauge whether its length was appropriate and wording comprehensible. The pre-survey included 30 questions. The post-survey included the exact same questions as those in the pre-survey, in addition to intervention-specific questions, amounting to a total of 40 questions. Students were provided randomly generated ID numbers by which their pre- and post-surveys could be matched to each other.

One component of data cleaning worth mentioning is that electronic records of selection and waste data were compared with their corresponding records on the paper

data sheets on which data was originally recorded. A small random sample of electronic and paper record were compared to estimate an error rate because one school's data contained more discrepancies relative to other schools. The estimated error rate ranged from 0.5% to 6.3% of total observations for each observation date for this sample, with an average of 2.4%. These rates are within the range of basic error rates found in various studies (Panko, 2008).

All data, observational and survey, is anonymous. This study was approved by Cornell University's Institutional Review Board and the school district's research review committee. Approval was also obtained from the food service director and the principals of each of the four schools. Passive consent and child assent was obtained for the survey. The study was designed in consultation with the Executive Director, Amie Hamlin, of CHSF.

3.5 Empirical Strategy

The first two hypotheses (H1 "Increased Demand," H2 "Increased Consumption") use the observational data to study CSF selection and CSF consumption. The outcome, Y_i, is modeled by the equation below when Y_i is estimated nonlinearly. Y_i is estimated nonlinearly when Y_i is represents CSF, Rajma or WABG selection.

$$Y_i = f(\alpha + \beta TreatmentGroup_i + \gamma InterventionPeriod_i + \delta(TreatmentGroup_i \cdot InterventionPeriod_i) + \lambda Controls_i + \varepsilon_i)$$

The outcome, Y_i, is modeled by the following equation when Y_i is estimated linearly. Y_i is estimated linearly when Y_i represents CSF, Rajma or WABG consumption:

$$Y_i = \alpha + \beta TreatmentGroup_i + \gamma InterventionPeriod_i + \delta(TreatmentGroup_i \cdot InterventionPeriod_i) + \lambda Controls_i + \varepsilon_i$$

The coefficients α, β, γ, δ, and λ are unknown parameters and ε_i is a random unobserved "error" term that captures determinants of Y_i not included by the model. α is a constant term. β is the effect specific to treatment group, accounting for average enduring differences between the treatment and control groups. γ is the time trend common to treatment and control groups. δ is the effect of the treatment, i.e. the average treatment effect on the treated. λ is the effect of the controls on outcome Y_i.

The difference in difference estimator is used to estimate the average treatment effect on the treated. The difference in difference estimator is defined as the difference in average outcome in the treatment group before and during treatment minus the difference in average outcome in the control group before and during treatment.

Tables 12 to 16 in Appendix A display the results of all the regressions discussed in the following sections. Each regression is individually referred to by a model number, e.g. model X.

3.5.1 Selection (H1)

The first hypothesis asks whether the interventions increased the likelihood of selecting CSF. The primary model used to answer this question is a logit model, with the dependent variable being the selection of CSF (model 1 in Table 12 in the Appendix A). The dependent variable is coded 1 when CSF is selected, and 0 if it is not. Controls are included for the child's grade (K-6), sex (male, female), and race (White, Black, Asian, Other), as well as entrée (Rajma, WABG). As mentioned before, leftovers are the only

major source of variation across schools in food item offerings, and some of these leftovers are very popular items like hot dogs, burgers, and chicken patties ("high popularity leftover items").[21] A control is also included for the number of distinct high popularity leftover items offered that day because the probability of selection expected to decrease in the number of high popularity leftover items offered. Entrée-specific selection models include all the same variables except entrée.

A multinomial logistic regression is used as a robustness check for the logistic regression described above to identify the treatment effect on CSF selection, with the dependent variable being the choice of entrée (model 2 in Table 12). One advantage of using this model is that it uses more information by disaggregating observations in which no entrée is selected based on what other entrée is selected. The base outcome for the multinomial logistic regression represents child-day observations in which no entrée is selected or a leftover entrée item is selected. Besides CSF, the other entrée choices included as levels for the dependent variable are grilled cheese and the entrées offered on a daily basis: bagel with cream cheese, bagel with melted cheese, peanut butter & jelly sandwich, cold cut sandwich and yogurt and crackers. One disadvantage of this model is that child-day observations in which multiple entrées are selected had to be excluded. There are, however, only 50 observations in the entire dataset in which this is the case. All the variables are the same as those in model 1. This modeling approach can also be

[21] When previously surveyed cafeteria managers most frequently listed bagels, pizza and hot dogs as the most popular non-CSF entrées (Baker, 2015). They also listed tacos, hamburgers, peanut butter and jelly, and chicken wraps. In focus groups, students most frequently mentioned peanut butter and jelly as their favorite food, especially younger children. Macaroni and cheese and cheese burgers were also mentioned more than once. Wardle and Cooke (2008) also report that high-fat foods are among children's favorites universally, and vegetables among their least favorites.

used to test another related hypothesis: the interventions had a negative treatment effect on the selection of another entrée. The logic for this hypothesis is that if the treatment has an effect, it should reduce the probability of selection of the other entrées via substitution effects.

Forming the basis for ancillary hypotheses, the dataset is also analyzed by entrée to obtain a more nuanced understanding of how generalizable the treatment effect is and to parcel out the effect of the number of replications of the interventions per entrée on the likelihood of selection from the total effect (model 3 for Rajma and 4 for WABG in Table 12). This allows us to explore the role of repeat exposure on selection and the idea that the treatment effect may change in the number of times it is implemented. One may expect diminishing returns to the effectiveness of these interventions the more times they are implemented. Anzman-Frasca et al. (2012), for example, found that increases in vegetable liking were detected by the sixth exposure, but additional tasting trials did not produce additional increases in liking. Since Rajma was offered twice in the intervention period but WABG offered once, this can only be explored with Rajma. When the outcome is Rajma selection, a dummy for number of times interventions are implemented (none, first, second) instead of period is used, with the coefficient of interest now being the coefficient on the interaction between the number of times treated and treatment group.

3.5.2 Consumption (H2)

The second hypothesis (H2 "Increased Consumption") asks whether the interventions increased consumption of CSF among those who have selected it. A multivariate linear regression is used to identify the treatment effect on consumption, with

the dependent variable being consumption in a quarter-servings, ranging from 0 to 1 (model 5 in Table 13 in Appendix A). The variables included are the same as those for selection in model 1, in addition to: lunch period duration in five minute increments; serving size of the CSF entrée that day in 25 gram increments; and number of food items on the tray. Research suggests that consumption may increase in lunch period duration and portion size.[22] The number of items on tray is included as a control to reflect the possibility that consumption may decrease in the amount of food a child selected.[23] Entrée-specific analyses of consumption are also conducted in models 6 and 7 in Table 13, using the same controls except for entrée.

3.5.3 Survey Outcomes: Knowledge, Perceptions and Preferences (H3 through H5)

The last three hypotheses (H3 "Increased Knowledge," H4 "Improved Attitudes," and H5 "Increased Sampling") use the survey data to identify the treatment effect on students' knowledge of CSF (H3), liking of CSF (H4), perceptions of CSF's healthfulness (H4) and sample uptake during the tastings (H5). A combination of logistic regressions and non-parametric tests are used to test these hypotheses.

Logistic regressions are used to test H3 ("Increased Knowledge") and part of H4 ("Improved Attitudes") by identifying the treatment effect on the pre-post changes in the

[22] See Cohen et al. (2016) for the role of lunch period duration in food choices and food consumption. For portion size, see references cited earlier in this paper in subsection 4.1, "Description of Data."

[23] In regards to the number of items on tray, Just & Price (2013b) found that children were placing more items on their tray when there were more options of fruits and vegetables, but that the percentage of items that they were discarding remained about the same.

following outcomes: knowledge of CSF (model 8); knowledge of Rajma (10); knowledge of WABG (12); and perceptions of peers' liking of CSF (18). Models 8, 10, 12 and 18 are in Table 14 in Appendix A. Given the presumed lack of knowledge, or at least recognition by name, of CSF and the specific entrées, the questions corresponding to these knowledge outcomes were asked after briefly describing CSF or each specific entrée. The question was then phrased in the following manner: "Do you know what [CSF/Ms. Patel's Rajma/West African Beans & Greens] is?" There were three options or levels for responses to these: "No," "Maybe" and "Yes." The question corresponding to perception of peers' liking of CSF was asked in the following manner: "How much do you think other kids like eating Cool School Food?" This question had six options as responses. Five of these options for the liking questions ranged from "really don't like" to "love", and the sixth was "They have never tried Cool School Food."

In models 8, 10, 12, and 18, the dependent variable is a dummy variable that represents a within-subjects change in response from the pre- to the post-survey. Since the response choices are ordinal, differences between the post-survey response and pre-survey response are not taken as could be taken with interval data. Instead, change scores are calculated. Dependent variables are only coded as 1 if there is a positive change from the pre- to the post-survey response and post-survey response is certainly positive, meaning that a change from a lower category to a "maybe" is coded as 0, as is no change or a negative change. The treatment effect in all models of survey outcomes is indicated by treatment group indicator, i.e. the coefficient on the dummy variable indicating membership to the treatment or control group of schools. The interaction of treatment group with the intervention period is excluded. By essentially comparing changes within

a person across treatment groups, this estimation method is analogous in concept to the differences-in-differences estimator. Controls include: sex (male, female), grade (3^{rd}, 5^{th}) and race (White, Non-white) and a dummy variable to indicate whether the respondent frequently eats school lunch or not (school-luncher, home-luncher). Since the interventions are targeting students who eat school lunch and the samples are offered primarily at the lunch line, it is expected that school-lunchers would score higher on baseline indicators and would be more responsive to the treatment.

Nonparametric tests are used to test H4 ("Improved Attitudes") by estimating the treatment effect on binary pre-post changes in the following outcomes: liking CSF generally; liking of the two CSF entrées specifically (liking Rajma; liking WABG); liking beans, the key ingredient in CSF entrées; and perceptions of CSF's healthfulness. Nonparametric tests are used because the highly skewed distribution of responses did not render logistic regressions feasible. The Mann-Whitney two-sample statistic, or the Wilcoxon rank-sum test,[24] is used to test the equality of distributions of the pre-post changes in the six aforementioned outcomes. The liking questions were asked in the following manner: "How much do you like eating [Cool School Food/Ms. Patel's Rajma/West African Beans & Greens]?" There were six response choices, five of those which were the same as those for model 18 on perceptions of peers' liking of CSF, and

[24] The Mann-Whitney two-sample test is a nonparametric analog of the independent two-sample t-test that can be used when the dependent variable is not a normally distributed interval variable. The dependent variable is assumed to be at least ordinal. The Mann-Whitney statistic indicates the likelihood that a member of one group will score higher than the member of the other group, a measure equivalent in this context to the probability that a person assigned to the treatment group will have a better outcome than a person assigned to the control group (Conroy, 2012).

the sixth was "I have never tried [Cool School Food/ Ms. Patel's Rajma/West African Beans & Greens]." The question corresponding to perception of CSF's healthfulness was: "How good for you is CSF?" There were six response choices for this question ranging from "Really bad" to "Really good," with the last option being "I don't know", which was excluded from analysis.

The selection of "[I/They] have never tried…" is excluded from the main analysis of the liking outcomes, but is included in a secondary analysis of liking outcomes. In this secondary analysis, the dependent variable is coded as 1 when the response changed from "I have never tried CSF" to "like" or "love," indicating liking of CSF, Rajma or WABG when the respondent tried one of them for the first time. The selection of never having tried CSF, Rajma or WABG formed the basis for other minor analyses in which it is an outcome itself, described in the section below on secondary analyses.

As a robustness check, an alternative specification for modeling the nine outcomes corresponding to H3 ("Increased Knowledge") and H4 ("Improved Attitudes") is implemented using ordinal logistic regressions. These nine outcomes include the three knowledge outcomes (models 9, 11 and 13 in Table 14 in Appendix A), the five liking outcomes (19-23 in Table 15 in Appendix A) and perception of CSF's healthfulness (17 in Table 14 in Appendix A). Data is stacked such that each observation represents a response for an individual for that period (child-period); before each observation represented an individual (child). Similar to the empirical strategy used to analyze the observational data, this specification uses a difference-in-difference estimator to identify the average treatment effect on the treated, which is the interaction between group (treatment/control) and period (pre-intervention/post-intervention). The dependent

variable is the outcome itself. As before, group and period are also included as variables in the regression. Each response choice, excluding "I have never tried…" or "They have never tried…" or "I don't know", represents a level of the dependent variable. The alternate specification for the knowledge outcomes includes the same variables as the main specification except for the variables additionally used for the difference-in-difference estimation, the group and period variables and their interaction. The alternate specification for the liking outcomes and perceived healthfulness includes all the variables used in the alternate model specification for the knowledge outcomes.

The strength of this robustness check is that it uses responses regardless of whether they are paired. In other words, responses from individuals are included in the analysis regardless of whether the individual only completed the pre-survey or only completed the post-survey. This leads to significantly larger estimation samples, which is appealing in light of the fact that the matched sample, those respondents who took the pre- and post-survey, is less than half of the entire pool of respondents. However, this strength is also a limitation. This robustness check, by not using the fact that some data is paired, in effect compares changes in outcomes between the pre- and post- survey on a population- rather than an individual-basis. One may think of it as the comparing the average difference within a group across groups, as opposed to comparing the average difference within an individual within a group across groups as in the main analysis.

H5 ("Increased Sampling") is tested using data from the question asking "Did trying samples of [Ms. Patel's Rajma/West African Beans & Greens] make you want to eat it? The selection of the last choice, "I have never tried a sample of [Ms. Patel's Rajma/West African Beans & Greens]" is used infer whether the respondent had ever

sampled Rajma or WABG. The treatment effect on never having sampled Rajma or WABG is analyzed using logistic regressions, the results of which are presented in models 30 and 31.

3.5.4 Survey Outcomes: Awareness of Interventions, Perceptions of Interventions' Impact and Survey as a Means of Increased Knowledge (H6 through H9)

Ancillary hypotheses are tested to identify the treatment effect on "post-only outcomes," outcomes extracted only from questions that were only in the post-survey because they were specific to the interventions. Analyses of post-survey data thus only look at between-group changes in responses between the treatment and control groups; there are no within-person changes. Post-only outcomes are analyzed by a combination of ordinal logistic regressions, logistic regressions and nonparametric tests in Table 16 in Appendix A. The controls in all these specifications are the same as those used in the logistic regressions described in 3.5.3, except with an additional variable indicating whether the respondent follows a vegan or vegetarian diet, since CSF entrées are vegan. Two post-only outcomes were already discussed under H5 ("Increased Sampling"). The other post-only outcomes are discussed under the following hypotheses: H6 "Awareness of Interventions;" H7 "Willingness to Try CSF;" and H8 "Perception of the Most Effective Intervention".

Ordinal logistic regressions are used to test H6 through H9 described below.

- H6 ("Awareness of Interventions"): Students either noticed or remembered the

interventions. Indicators include noticing the posters and signs (model 27) and remembering the morning announcements (24). See copy of the post-survey in Appendix D for the questions corresponding to H6 and H7 below. Questions corresponding to H6 and H7 had four response choices: "No," "Maybe," "Yes," and "I don't know", the last of which is excluded from analyses.

- H7 ("Increased Willingness to Try CSF"): Students believed that each of the three interventions influenced their willingness to try or eat CSF. Different indicators include: believing that the posters and signs influenced the respondent's willingness to try CSF (model 25); believing that the morning announcements influenced the respondent's willingness to try CSF (26); believing that trying samples of Rajma influenced the respondent's willingness to eat CSF (28); and believing that trying samples of WABG influenced the respondent's willingness to eat CSF (29).

- H8 ("Changed Perception of the Most Effective Intervention"): The interventions collectively changed students' perception of the most effective tool for influencing their willingness to eat CSF. The samples are the key intervening activity because it exposes children to the taste and sight of CSF. While this study as designed cannot test whether samples are the most effective among the three interventions, as a proxy, samples are expected to be one of the most frequently selected responses among students who have tried CSF in the treatment group.

H8 is tested using responses to the following question: "Which of the things below do you think made you want to eat Cool School Food the most in the last three weeks?" Response choices included: announcements; posters and signs; samples; none; and "I never tried Cool School Food." Fisher's exact test[25] of the association between the responses to this question and treatment status is used to identify the treatment effect on the respondent's perception of the most effective intervention.

H9, described below, is tested because the survey was identified as a factor in the respondent's willingness to try CSF in an open-ended question at the end of the survey.

- H9 ("Increased Knowledge due to Survey"): The process of being informed about and taking the survey increased knowledge of CSF (model 14), Rajma (15) and WABG (16) among students in the control schools. This process includes taking the survey and possibly reading informational materials about the survey sent home to parents, as well as being informed about the survey verbally or otherwise by the principal, teachers or other faculty members.

Ordinal logistic regressions are used to explore the role of the survey as an information tool, i.e., whether the survey increased knowledge of CSF or of the two entrées specifically in the control schools. The same variables are included as those in

[25] Fisher's exact test tests the association between two categorical variables and can be used when cell sizes in a contingency table are small.

regressions of the knowledge outcomes, excluding the indicator for group and the interaction between period and group. In these regressions, the coefficient on intervention period variable is used as evidence as to whether the survey may have had the unintentional consequence of influencing study outcomes.

3.5.5 Standard Errors

Standard errors in all models, using observational or survey data, are clustered at the grade-school level. Since the arrival at lunch of students from different grades is usually staggered, this level of clustering reflects the idea that students' choices are most likely to be dependent on the choices of other students in their own grades. In two schools, two grades are put in one cluster because their lunch periods started only five minutes apart and it was noted by data collectors that these grades were sometimes mixed in the lunch line; thus, choices of students from one of these two grades may be influenced by choices of students from the other grade. Clustering at the grade-school level described amounts to up to eighteen clusters in the analyses of the observational data and seven clusters in the analyses of the survey data. Studies with a small number of clusters have collectively been criticized for not using procedures that properly account for this fact and reporting inflated significance levels (Bertrand, Duflo, & Mullainathan, 2004; Ozler, 2012). To address these concerns, standard errors in nonlinear models in this paper are transformed using a score bootstrapping procedure with a finite sample correction.[26]

[26] The command used in nonlinear models in this paper is "scoretest," provided through the user-written post-estimation program in Stata called "boottest" (Roodman 2018). "Scoretest" tests linear hypotheses about parameters using the score bootstrap, an adaptation of the wild bootstrap for the general extremum estimator. According to the Stata help file, it is "best seen as bootstrapping the Rao score/LM test."

Standard errors in linear models use a wild bootstrapping procedure.[27] Both these procedures increased the standard errors significantly.[28] All analyses were completed in Stata (Version 15; Statacorp, 2017).

[27] The command used in linear models in this paper is "clustse," provided through the user-written program in Stata with the same name (Menger, 2017). It uses the wild cluster bootstrap procedure. According to the Stata help file, it is "intended to use for obtaining accurate inference about the statistical significance of a parameter when the data is clustered with a small number of clusters, or a moderate number of clusters of uneven size."

[28] One study found that analyses of cluster randomized trials in which procedures accounting for a small number of clusters were used had low power when fewer than 20 clusters were randomized (Leyrat, Morgan, Leurent, & Kahan, 2018).

CHAPTER 4

4 Results

4.1 Description of Data

The observational dataset consists of observations of elementary school students who participated in school lunch on the observation dates. All grades, K-5, were observed except in school C1 in which data was collected only on students from grades 2-5. This is because Kindergarteners and first graders in C1 are located in a separate building, and including them would have required additional research assistants. The survey dataset consists of observations from students in grades 3-5 who provided assent and did not opt out, whose parents did not opt out for them and whose teachers distributed the surveys, since not all teachers distributed the surveys.

The race, sex, and grade composition CSF consumers, the entire dataset and the entire school population is provided below in Tables 2 to 4 for purposes of comparison. Data was collected on almost all of the population of students who eat school lunch in these schools on the observation dates, so the dataset should be fairly representative of the total school lunch population. Within the city the schools are located, two of the four schools (T1 and T2) are located in suburbs and two (C1 and C2) and are located close to downtown. School-specific data collected in this study and provided by NYSED is described in Tables 17-20 in Appendix A.

In totality, the observational dataset includes four schools, 24 school-day observations and 3,319 child-day observations, 278 in which CSF is recorded as selected. CSF consumption data exists for 247 of these 278 observations. However, on November

30 in C1, there are no observations of CSF being selected. There is no known explanation for this.[29] Table 5 and Figure 1 show the number of CSF or Rajma meals selected by period and group. Table 6 and Figure 2 show the mean percentage of a CSF serving consumed by period and group. Following that in Tables 7 to 9 and Figure 3 are statistics and graph relevant to CSF selection and consumption.

[29] The average number of CSF meals selected for C1 is about 6, with a range of 0 to 12.

Table 2. Grade Composition of CSF Consumers vs. Dataset vs. School Population

Grade	CSF Consumers	Entire Dataset	Total Population of 4 Schools	CSF Consumers v. Dataset P-value	CSF Consumers v. Population P-value	Dataset vs. Population P-value	CSF Consumers vs. Dataset vs. Population P-value
K	33	522	249				
	12.55	16.46	17.33	0.116	0.058	0.469	0.157
1st	24	442	239				
	9.13	13.94	16.63	0.031	0.002	0.018	0.002
2nd	28	516	241				
	10.65	16.27	16.77	0.017	0.013	0.668	0.035
3rd	52	531	266				
	19.77	16.75	18.51	0.231	0.607	0.153	0.197
4th	68	695	244				
	25.86	21.92	16.98	0.143	0.001	0	0
5th	58	465	198				
	22.05	14.66	13.78	0.002	0.001	0.441	0.004
Total	263	3,171	1,437				
	100	100	100				

* Frequency by population listed first in each cell, percentage below that. Total population is the total population of the four schools in this study. Pre-K and ungraded students were excluded from the calculations for the total population of the four schools. Kindergarteners and first graders from C1 were also excluded from the observational data sample but were included in this total population calculation, potentially explaining some differences between the three populations (CSF consumers vs. dataset vs. total population).

* Source of data of the composition of CSF consumers and the entire dataset is from the observational data collected in this study. The source of data on the school population is data.nysed.gov, provided by the New York State Education Department (NYSED). Please note that data collected during this study is during the 2017-8 school-year, but the most recent NYSED data is for the 2016-7 school-year, so the latter may not fully represent the following year's population.

* P-values were calculated using Fisher's exact test.

Table 3. Racial Composition of CSF Consumers vs. Dataset vs. School Population

Race	CSF Consumers	Entire Dataset	Total Population of 4 Schools	CSF Consumers v. Dataset P-value	CSF Consumers v. Population P-value	Dataset vs. Population P-value	CSF Consumers vs. Dataset vs. Population P-value
White	121	1,559	865				
	46.36	49.95	60.15	0.274	0	0	0
Black	38	512	94				
	14.56	16.4	6.54	0.485	0	0	0
Asian	66	611	246				
	25.29	19.58	17.11	0.03	0.002	0.05	0.005
Other**	36	439	233				
	13.79	14.07	16.2	1	0.357	0.059	0.156
Total	261	3,121	1,438				
	100	100	100				

* Frequency by population listed first in each cell, percentage below that. Total population is the total population of the four schools in this study. Pre-K and ungraded students were excluded from the calculations for the total population of the four schools. Kindergarteners and first graders from C1 were also excluded from the observational data sample but were included in this total population calculation, potentially explaining some differences between the three populations (CSF consumers vs. dataset vs. total population).

* Source of data of the composition of CSF consumers and the entire dataset is from the observational data collected in this study. The source of data on the school population is data.nysed.gov, provided by the New York State Education Department (NYSED). Please note that data collected during this study is during the 2017-8 school-year, but the most recent NYSED data is for the 2016-7 school-year, so the latter may not fully represent the following year's population.

* P-values were calculated using Fisher's exact test.

** Other was calculated from the NYSED data as Hispanic or Latino, Native American or multiracial.

Table 4. Sex Composition of CSF Consumers vs. Dataset vs. School Population

Grade	CSF Consumers	Entire Dataset	Total Population of 4 Schools	CSF Consumers v. Dataset P-value	CSF Consumers v. Population P-value	Dataset vs. Population P-value	CSF Consumers vs. Dataset vs. Population P-value
Male	120	1,512	728				
	45.98	48.18	50.63	0.519	0.179	0.126	0.2
Female	141	1,626	710				
	54.02	51.82	49.37	0.519	0.179	0.126	0.2
Total	261	3,138	1,438				
	100	100	100				

* Frequency by population listed first in each cell, percentage below that. Total population is the total population of the four schools in this study. Pre-K and ungraded students were excluded from the calculations for the total population of the four schools. Kindergarteners and first graders from C1 were also excluded from the observational data sample but were included in this total population calculation, potentially explaining some differences between the three populations (CSF consumers vs. dataset vs. total population).

* Source of data of the composition of CSF consumers and the entire dataset is from the observational data collected in this study. The source of data on the school population is data.nysed.gov, provided by the New York State Education Department (NYSED). Please note that data collected during this study is during the 2017-8 school-year, but the most recent NYSED data is for the 2016-7 school-year, so the latter may not fully represent the following year's population.

* P-values were calculated using Fisher's exact test.

Table 5. CSF Selection by Period and Group

	Baseline Period	Intervention Period	Total
Control	38 (6.2%)	52 (8.0%)	90 (7.1%)
	613	648	1,261
Treatment	65 (6.3%)	125 (12.2%)	190 (9.2%)
	1,034	1,024	2,058
Total	103 (6.3%)	177 (10.6%)	280 (8.4%)
	1,647	1,672	3,319

* Selection is calculated as the percentage of child-day observations in which CSF is selected for a given period in the *entire dataset*.
* Consumption is in parentheses, and is measured as the mean consumption in quarter-servings.
* Difference is reported in percentage of total child-day observations that selected CSF. Total number of observations listed last in each cell.

Table 6. CSF Consumption by Period and Group

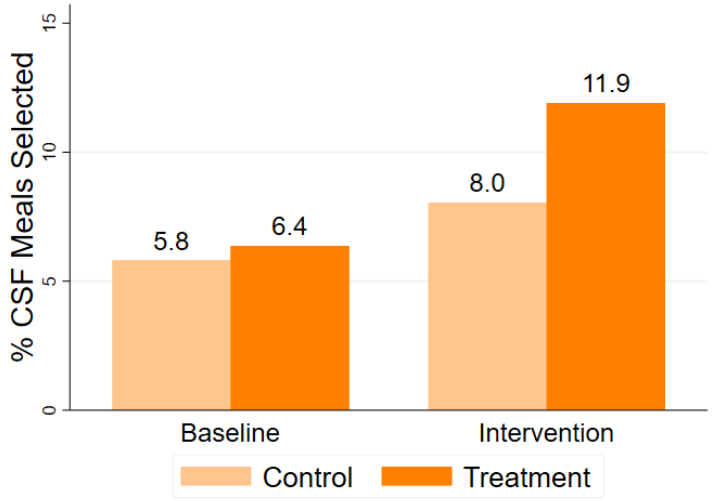
	Baseline Period	Intervention Period	Total
Control	0.66	0.72	0.69
	0.37	0.29	86
	37	49	
Treatment	0.63	0.62	0.62
	0.33	0.38	161
	52	109	
Total	0.64	0.65	0.65
	89	158	247

* Consumption is measured in mean quarter-servings consumed for a given period and group in the *entire dataset*.

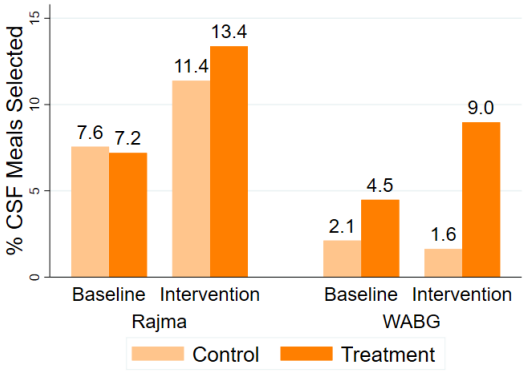
* Mean servings consumed is reported first, then below that standard deviation, and then frequency of child-day observations for which there is CSF consumption data.

Figure 1. CSF and Rajma Selection Bar Graphs

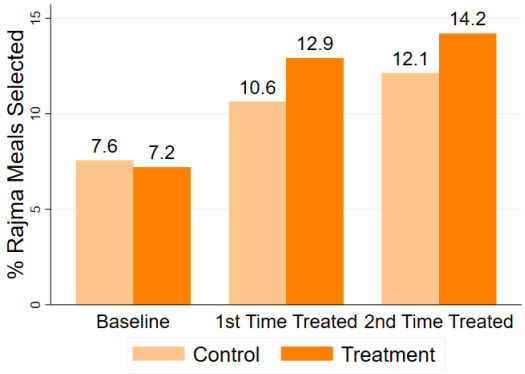
CSF Selection by Period and Group.



CSF Selection by Entrée, Period and Group.



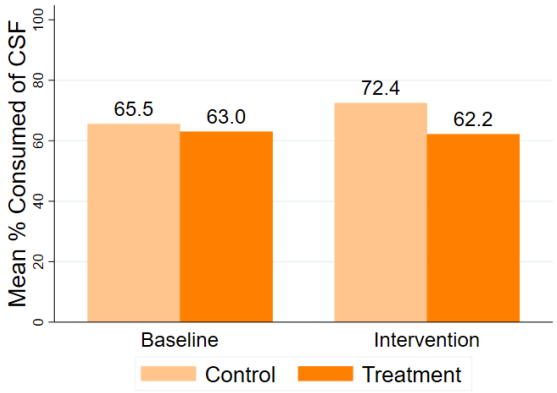
Rajma Selection by Time Treated and Group.



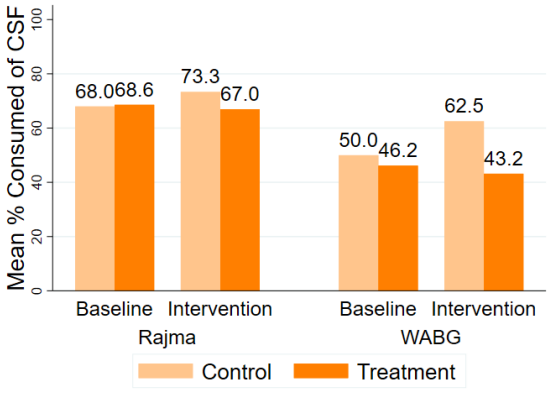
Note: Data is limited to the estimation sample of model l to make the top graph and bottom left graph and model 3 for the bottom right graph.

Figure 2. CSF Consumption Bar Graphs

Mean Percentage of a CSF Serving Consumed by Period and Group.



Mean Percentage of a CSF Serving Consumed by Entrée, Period and Group



Note: Data is limited to the estimation sample of model 5 to make these graphs.

The most popular entrée according to Table 7 by far is grilled cheese, by period, group and for the whole dataset. More than half the entire dataset selects grilled cheese. Furthermore, demand of grilled cheese is relatively stable in the dataset; selection across periods within each treatment group only differs by about 2% of each other. The second most popular item for the entire dataset and for the majority of period-group combinations is bagel with cream cheese. Among the entrées, CSF in this study fares somewhere in the middle, slightly moving up the ranks of popularity during the intervention period in the treatment schools, surpassing bagel with cream cheese and cold cut sandwiches.

Serving size for Rajma ranges from 148 to 209 grams, with a mean of about 179 grams and a standard deviation of about 20 grams. For WABG, serving size ranges from 144 to 247 grams, with a mean of 182 grams and a standard deviation of about 35 grams. About 40% of CSF consumers consume one whole serving. The frequency distribution of CSF Consumption is shown in Figure 3. Except for bagel with cream cheese, servings consumed of entrées, shown in Table 8, seem to be negatively associated with serving size, shown in Table 9. CSF is the most wasted of the entrées, but also the greatest in weight. This could imply that children are consuming more grams of CSF because of its larger serving size. Indeed, research on portion sizes supports this hypothesis, that children may consume more when portions are larger (Gibson et al., 2012; Just, Lund, & Price, 2012; Patrick & Nicklas, 2005). Lunch periods last from 17 minutes to 33 minutes, with a mean of about 25 minutes and a standard deviation of 3 minutes.

Table 7. Ranking of Entrées by Popularity

	Period/Group				
Ranking	**B/C**	**B/T**	**I/C**	**I/T**	**Total**
1	Grilled cheese (60%)	Grilled cheese (49%)	Grilled cheese (59%)	Grilled cheese (47%)	Grilled cheese (52%)
2	Bagel/CC (10%)	Bagel/CC (10%)	Bagel/CC (10%)	**CSF (12%)**	Bagel/CC (10%)
3	**CSF (6%)**/ PB&J (6%)	Cold cut (8%)	PB&J (7%)	Bagel/CC (10%)	**CSF (8%)**
4	Cold cut (5%)	**CSF (5%)**	**CSF (6%)**	Cold cut (6%)	Cold cut (6%), PB&J (6%)
5	Bagel/MC (4%)	Bagel/MC (5%), PB&J (5%)	Bagel/MC (6%)	PB&J (5%)	Bagel/MC (5%)
6	Yogurt & crackers (0.2%)	Yogurt & crackers (4%)	Cold cut (5%)	Yogurt & crackers (4%), Bagel/MC (4%)	Yogurt & crackers (3%)
7			Yogurt & crackers (0.3%)		

* Popularity is determined by the percentage of child-day observations in which item is recorded as selected for a given period.
* Abbreviations for period: B= Baseline period; I= Intervention period; T= Treatment schools; C = Control schools.
* Columns do not add up to 100% because observations in which leftovers are selected as entrées or in which no entrées are selected are excluded.
* Bagel/MC= bagel with melted cheese; Bagel/CC= bagel with cream cheese; PB&J= Peanut butter & Jelly; Cold cut= cold cut sandwiches.

Figure 3. Histogram of CSF Consumption in Quarter-Servings

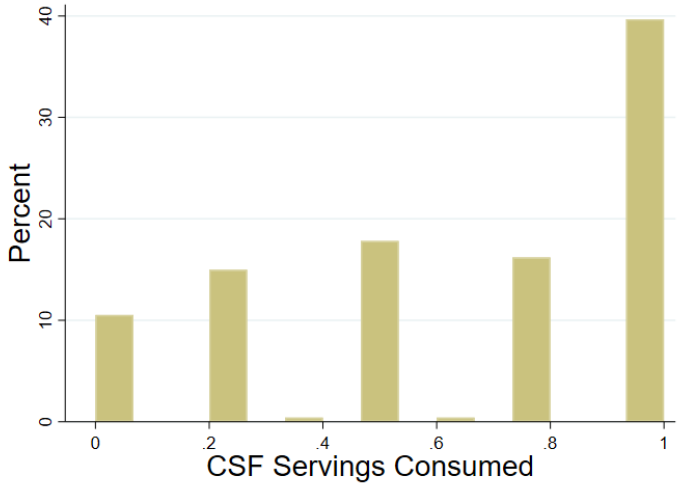


Table 8. Ranking of Entrées by Mean Servings Consumed

Ranking	Entrée	Mean Servings Consumed
1	Bagel/MC, TC	79-80%
2	Bagel/CC, PB&J, Cold cut	67-68%
3	**CSF**	65%

Table 9. Ranking of Entrées by Mean Serving Size

Ranking	Entrée	Mean Serving Size
1	**WABG**	**193 g**
2	**Rajma**	**176 g**
3	PB&J	139 g
4	Cold Cut	125 g
5	TC	108 g
6	Bagel/MC	106 g
7	Bagel/CC	75 g

* Serving size data is not collected every single day at every single school.

In the survey dataset, there are 398 distinct students who took either the pre-survey or the post-survey, representing an estimated 86 percent of the total population of third and fifth graders in the four schools based on 2016-7 data provided by NYSED. There are 356 responses in the pre-survey sample and 216 responses in the post-survey sample.[30] 174 respondents took the pre- and post-survey, and thus 174 responses comprise the matched sample upon which pre-post analyses are conducted.[31] Key background characteristics were compared between the matched and unmatched sample using Fisher's exact test. The test revealed that the two samples are not significantly different in terms of race, grade, frequency of lunch consumption and diet. A two-sample Wilcoxon rank-sum (Mann-Whitney) test additionally reveals that the samples are not significantly different in terms of age. Summary statistics of survey responses are provided in Tables 21 to 23 in Appendix A.

4.2 Results for Hypotheses H1 through H5

This section will examine the results of the nine proposed hypotheses.

[30] The post-survey sample is significantly smaller than the pre-survey sample. This may possibly be due to its administration the week before holiday break. Attrition bias is not expected to be a concern since the teachers were responsible for distributing the surveys to their students, and teacher characteristics are not expected to be correlated with student characteristics; furthermore, once distributed, records indicate that most students opt to take the survey.

[31] By individual, there are 174 matched responses, 182 unmatched responses in the pre-survey sample and 42 unmatched responses in the post-survey sample. Based on data.nysed.gov, there were 464 third and fifth graders in the schools from 2016-2017, indicating that almost 77 percent of the entire possible population took the pre-survey.

H1 ("Increased Demand"): The interventions increased the probability of selecting CSF as a whole by 5.4% and selecting WABG by 4.3% but neither of these increases are statistically significant. However, the interventions the second time Rajma was offered significantly increased the probability of selecting Rajma by 6.5%.

The results in Table 12 in Appendix A indicate that the marginal effect of the treatment on the probability of selection is about 5.4% (model 1). Due to the relatively small proportion of CSF consumers in the dataset, the range of predicted probabilities is narrow, starting at 1.2% and never exceeding 33%, with a mean of 8.3% and standard deviation of 5.0%. Thus, the marginal effect is roughly equivalent to an increase by one standard deviation. While the sign is in the expected direction, the treatment effect on the log odds of selection is not statistically significant. It appears that more children in T2 chose Rajma during the last in-line tasting of Rajma than during any observation date in the present study.

This result is consistent with the robustness check. The treatment effect is not statistically significant in the multinomial logistic regression of entrée choice either (model 2). The treatment is associated with a statistically significant decrease in the log odds of selecting bagel with melted cheese, or a 4.6% decrease in the probability of selection. Bagel with melted cheese has two close substitutes, bagel with cream cheese and grilled cheese, perhaps making it more vulnerable to competition than other entrées. However, given the number of parameters estimated in this model, this is not strong evidence for substitution effects taking place; this result can also be explained by

idiosyncratic variation.

Results from model 3 looking at just Rajma selection, however, reveal that there is a treatment effect for Rajma the second time the interventions were implemented, but not the first time. The marginal effect on the probability of Rajma selection for the second time is smaller in magnitude than that for the first time (4.7% vs. 6.5%), but not significantly different from it, in contrast to expectations outlined in H1. In regards to WABG selection, the treatment is associated with a 4.3% increase in the probability of selecting WABG, but this increase is not statistically significant (model 4).

H2 ("Increased Consumption"):. The interventions decreased consumption of CSF by 10.3% of a full serving. By entrée, the interventions decreased consumption of Rajma by 10.9% and WABG by 16.1%. There are no statistically significant treatment effects on CSF consumption.

Since the sample is limited to those who selected CSF, the sample used to estimate the treatment effect on consumption compared with selection is significantly smaller. The number of child-day observations in model 5, for example, is 221. The treatment effect is not statistically significant when looking CSF consumption as a whole (model 5 in Table 13 in Appendix A) or each entrée separately (model 6 for Rajma and 7 for WABG).

H3 ("Increased Knowledge"): The interventions significantly increased the probability of affirmatively knowing what CSF is by 39.4% (model 8 in Table 14

in Appendix A), what Rajma is by 42.8% (model 10) and what WABG is by 32.4% (model 12).

H4 ("Improved Attitudes"): The interventions did not have a statistically significant effect on liking of CSF, Rajma or WABG among those who had *already* tried CSF, Rajma or WABG, respectively. The interventions also did not significantly impact liking of beans, perceptions of peers liking CSF among those who thought their peers have tried CSF or perceptions of CSF's healthfulness. However, students in the treatment group relative to the control group are likely to like CSF and Rajma more than students in the control group if they had *never* tried CSF or Rajma before, respectively. A student in the treatment group has more than a 50% chance of liking CSF or Rajma; specifically, a student in the treatment group is 54.1% likely to like CSF more than a student in the control group and 57.2% more likely to like Rajma. A student in the treatment group is also 51.8% likely to think their friends like CSF more than a student in the control group. There is no significant treatment effect on liking beans or WABG even among students who had never tried it before.

In regards to the liking questions, when the outcome is coded as 1 when the response changed to "like" or "love" from one of the lower categories, excluding students who had never tried CSF/Rajma/WABG and students who thought their friends had never tried CSF, there are no statistically significant differences in the distributions of changes

in the four liking indicators: liking CSF; liking Rajma; liking WABG; and thinking their friends like CSF.

However, when the indicator is coded as 1 when the response changed from "I have never tried CSF" to "like" or "love", there are statistically significant differences associated with liking CSF, liking Rajma and thinking their friends like CSF, but not liking beans or liking WABG. The results of the Mann-Whitney two-sample statistic indicate that, for the three aforementioned outcomes significantly and positively associated with liking, the treatment group had a higher rank. They also indicate that the probability of an observation in the treatment group having a true value that is higher than an observation in the control group for liking CSF, liking Rajma, and friends liking CSF is about 54.1%, 57.2% and 51.8%, respectively.

There is no statistically significant difference in the distribution of changes in perceptions of CSF's healthfulness, with the indicator being coded as 1 when the response changes to "Good" or "Really Good" from one of the lower categories.

The alternate specification confirms the robustness of the results corresponding to H3 ("Increased Knowledge") and H4 ("Improved Attitudes"). This modeling approach for the knowledge outcomes results in statistically significant and positive treatment effects. The marginal effect of the treatment on the probability of responding "Yes" to knowing what CSF, Rajma, or WABG is 32.4%, 26.1% and 37.6%, respectively (models 9, 11 and 13 in Table 14 in Appendix A). These effects are smaller in size than those found from the main specification, except for WABG. The alternate specification for the other six outcomes, liking and perception of CSF's healthfulness (19-23 in Table 15 and 17 in Table 14), does not result in any statistically significant treatment effects, consistent

with the non-parametric tests used to analyze liking outcomes among children who had tried CSF/Rajma/WABG before and healthfulness perceptions.

H5 ("Increased Samplings"): The interventions significantly increased the probability of sampling Rajma and WABG during the intervention period by 25.5% and 29.5%, respectively.

Results reveal that the treatment is associated with a statistically significant and negative effect on the probability of never sampling Rajma and never sampling WABG, with the marginal effect being -29.5% and -25.5%, respectively.

4.3 Results for Hypotheses H6 through H9

H6 ("Awareness of Interventions"): There is a statistically significant and positive treatment effect on remembering the announcements (model 24 in Table 16 in Appendix A) and noticing the posters and signs (model 27), with the marginal effects on the probability of responding "Yes" being 46.2% and 36.9%, respectively.

H7 ("Increased Willingness to Try CSF"): The interventions led to the belief that the morning announcements influenced students' willingness to try CSF, increasing the probability of responding "Yes" by 12.6%, but not to the belief that the posters and signs or samples influenced their willingness to try or eat Rajma

or WABG.

There is a statistically significant and positive treatment effect on believing that the announcements made the respondent want to try CSF, with the marginal effect on the probability of responding with "Yes" being 12.6% (model 26 in Table 16 in Appendix A). There are no statistically significant treatment effects associated with the other outcomes: believing that the poster and signs increased the respondent's desire to try CSF (model 25) and believing that the samples increased the respondents' desire to eat Rajma (model 28) or WABG (model 29).

> H8 ("Changed Perception of the Most Effective Intervention"): The interventions influenced children's perception of which tool would be the most effective in influencing their willingness to eat CSF. The proportion of respondents who selected samples as the most effective tool is significantly higher in the treatment group than in the control group, providing support for the perception that samples were the most effective intervention for increasing willingness to eat CSF among those who have tried it.

The frequency and percentage across response choices corresponding to the question on the most effective tool for making respondents try CSF is shown below in Table 10. Fisher's exact test of the association between the responses to this question and treatment is highly significant, with a p-value of 0.000, suggesting that the treatment influenced children's perception of which tool would be the most effective. Fisher's exact

test also reveals that the proportion of respondents who selected “Samples” in the control versus the treatment groups is significantly different, with a p-value of 0.000. Fisher’s exact test also reveals that the proportion of respondents selecting “None” is not significantly different between treatment groups, and that the proportion of respondents selecting “Never Tried” is significantly different between groups at the 10% level, providing further support for H5 (“Increased Sampling”).

Table 10. Perception of Most Effective Tool

Ranking	Control Group	Treatment Group
1	Never tried = 59 (63%)	Never tried = 37 (39%)
2	None = 20 (22%)	Samples = 26 (28%)
3	Announcements = 5 (5%); Samples = 5 (5%)	None = 15 (16%)
4	Posters & signs = 4 (4%)	Posters & signs = 10 (11%)
5		Announcements = 6 (6%)
	Total = 93 (100%)	Total = 94 (100%)

There was also an open-ended question at the end of the survey that asked "Is there anything else you think made you want to try Cool School Food or made you like Cool School Food?" 107 out of 216 (49.5%) percent of respondents wrote a response in answer to the open-ended question, although many answers were not meaningful. Six respondents wrote that their friends did or would influence them to try CSF. Three respondents said they would try CSF because of the smell. One student noted health as a reason for wanting to try CSF. One student noted that they would try CSF because of their common heritage with WABG. Three respondents also said they would try CSF because of the survey, the reason for testing the following hypothesis:

> H9 ("Increased Knowledge due to Survey"): The intervention period is significantly and positively associated with the probability of affirmatively knowing what Rajma is, increasing it by 9.4%. The survey is not associated with a statistically significant effect on the knowledge of CSF generally and WABG specifically in the control schools.

4.4 Secondary Two-way Analyses

Based on the objectives of this study[32] and relevant literature, secondary analyses are conducted on the survey data to look at the following relationships using Goodman and Kruskal's gamma:[33]

1) Awareness of posters and signs/announcements and knowledge of CSF/ Rajma/WABG (**objective 1**);
2) Awareness of posters and signs/announcements and never having sampled Rajma/WABG (**objective 2**).
3) Awareness of posters and signs/announcements and never having tried CSF (**objective 2**);[34]
4) Knowledge of CSF/Rajma/WABG and never having sampled Rajma/WABG (**objective 2 through objective 1**);
5) Knowledge of CSF/Rajma/WABG and never having tried CSF/Rajma/WABG (**objective 2 through objective 1**);

[32] As a reminder, the main objectives of the interventions implemented and evaluated in this study are to: (objective 1) increase knowledge about CSF and its availability as an option at lunch; (objective 2) encourage elementary schoolchildren to try CSF; and (objective 3) ultimately, increase demand of CSF entrées during school lunch.

[33] Goodman and Kruskal's gamma is a measure of rank correlation between ordinal variables.

[34] Regarding the distinction between (2) and (3), sampling refers to trying CSF through in-line tastings, while having tried CSF is intended to refer to trying CSF through any means, including samples. Sampling and having tried CSF also correspond to different survey questions. Respondents' interpretation may differ from the intended interpretation. Fisher's exact test of the relationship between never having sampled each entrée and never having tried is highly significant, with a p-value of 0.000 for each entrée, suggesting that this interpretation seems to hold with respondents.

6) Happiness toward school lunch and liking of CSF/Rajma/WABG. This investigation is motivated by literature linking attitudes toward and preferences of school food; Tuorila et al. (2015) found that "hedonic ratings of the meals were positively predicted by attitudes to school food, perceived hunger, and appropriate queuing in the canteen, and negatively predicted by food neophobia and being a 6th or 8th grader;"
7) Frequency of at-home consumption of entrées similar to Rajma/WABG and liking of CSF/Rajma/WABG. Relationships investigated in (7) through (10) are broadly motivated by literature linking exposure, familiarity and neophobia with food acceptance and food preference;
8) Frequency of at-home fruit/vegetable/beans consumption and liking/never having tried/sampled Rajma/WABG. These investigations are based on research that suggests that frequency of exposure to fruits and vegetable at home predisposes children to eat a wider variety of healthy foods at schools. Specifically, children who reported higher frequency of exposure to fruits and vegetables at home consumed a wider variety of fruits and vegetables at school and were more likely to report selecting healthier entrées for lunch (Korinek, Bartholomew, Jowers, & Latimer, 2013). Within the context of this study, greater at-home consumption of fruits, vegetables or beans may predispose children to prefer beans and subsequently CSF entrées relative to children who don't consume these foods as frequently, since the CSF recipes are bean-based;

Relative to fruits and vegetables, in which the frequency distribution of responses is skewed toward the highest two levels, beans are less frequently eaten.

These results are similar to Kaiser et al.'s findings (2012) that among fruits, vegetables, nuts/seeds, grains, protein (hard-boiled eggs, lean ham) dairy and beans, previous exposure was lowest among the bean group. These results contrast findings from Heim et al.'s study (2009 that, at baseline, more than two-thirds of children had tried at least 75% of the 16 fruits and vegetables, with beans being among the more common. The discrepancies may imply that it is hard to make general statements about the frequency of at-home consumption of beans relative to fruits and vegetables across different study populations.

9) Liking trying new foods and never having sampled Rajma/WABG;
10) Liking trying new foods and never having ever tried CSF/Rajma/WABG; and
11) Liking trying new foods and liking CSF/Rajma/WABG[35]

Only strong or semi-strong associations are reported in the following discussion. A semi-strong association is indicated by a gamma statistic greater in absolute value between 0.5 and 0.64, and a strong-association is indicated by a gamma statistic greater than 0.64. (1) There is a semi-strong relationship between knowing what Rajma is and both noticing posters and signs (gamma = 0.61) and remembering announcements (gamma = 0.52), as well as knowing what CSF is and noticing posters and signs (gamma = 0.54). (2) There is a strong negative association between noticing posters and never sampling Rajma, as well as remembering announcements and never sampling Rajma

[35] 6, 7, 9, 10, 11 use only pre-survey data because at the time of the pre-survey, treatment is not an intervening factor in the relationships between the listed variables. The other listed relationships use only post-survey data because they involve only post-only outcomes.

(gamma = -0.71, -0.66, respectively). There is a semi-strong but weaker negative association between those two variables and never sampling WABG (gamma = -0.54, -0.53, respectively). (3) is analyzed using Fisher's exact test. There are statistically significant relationships between both noticing posters and signs and never having tried Rajma, and remembering announcements and never having tried Rajma at the 5% and 1% levels, respectively. (4) There is no strong association between any of knowledge and sampling indicators. (5) There are semi-strong associations between both knowledge of Rajma and never having tried it, and WABG and never having tried it (gamma = -0.62, -0.52, respectively). It is worth noting that a student could try CSF without knowing what it is and could know what it is without having ever trying it. (6) There is no strong association found between attitudes toward school lunch and CSF generally or the two entrées specifically. (7) There is a strong association between the frequency of consuming entrées like Rajma and WABG at home and liking Rajma and WABG, respectively (gamma= 0.71 for Rajma, 0.78 for WABG). (8) Table 11 below shows the distribution of the frequency of at-home consumption of fruits, vegetables and beans. The only strong association between any of these variables and liking indicators is between frequency of bean consumption and liking Rajma (gamma=0.57). (9) - (11) There are no strong associations found between liking trying new foods and sampling/trying indicators or liking CSF generally and the two entrées specifically.

Table 11. Frequency of Fruits, Vegetables and Beans Consumption

	Frequency of … Consumption		
	Fruit	Vegetables	Beans
In many meals a day	45%	5%	6%
In one meal a day	27%	26%	5%
Some days I eat beans, other days I don't	27%	34%	62%
Never	1%	34%	27%

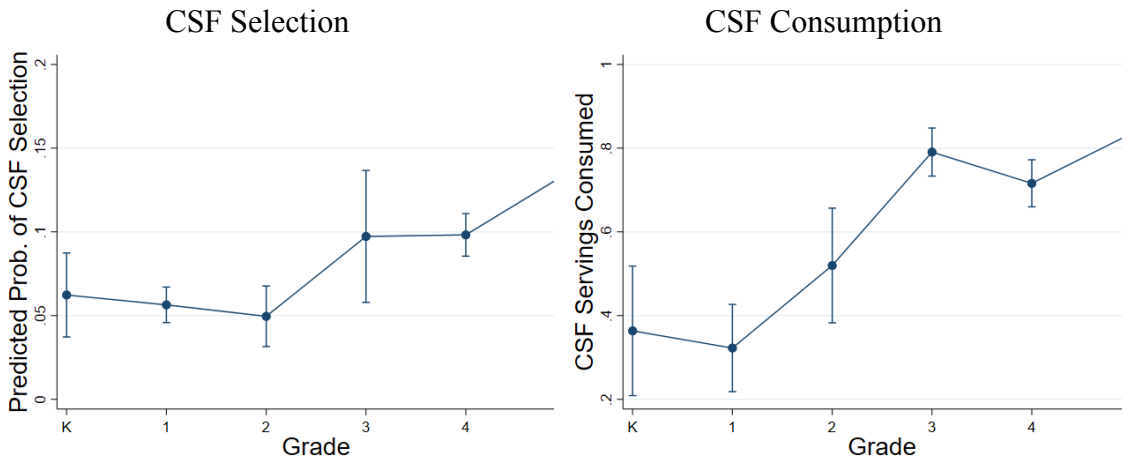
4.5 Other Factors: Observational

In regards to the demographic characteristics of CSF consumers across the observational and survey data analyses, grade and age consistently have statistically significant effects, race sometimes does and gender occasionally does. The highest grades -- generally four and five and sometimes three -- relative to kindergarteners, and age, when dummies for each grade could not be included, have statistically significant and positive effects in almost analyses in which these covariates are included. Grades four and five significantly increases the probability of selecting CSF relative to kindergarteners in the main framework by 3.6% and 7.2%, respectively. In other models, fourth grade relative to kindergarten increases the increases the probability of Rajma selection by 4.5% (model 3), increases the amount of a CSF serving consumed by 35.2% (5) and increases the amount of a Rajma serving consumed by 35.1% (6). Fifth grade relative to kindergarten increases the probability of selecting CSF by 5.3% in the CSF equation within the multinomial logistic framework selection (2), increases the probability of selecting Rajma by 8.5% (3), increases the amount of a CSF serving consumed by 47.2% (5) and increases the amount of a Rajma serving consumed by 45.4% (6). The only grade lower than four that produces statistically significant effects relative to kindergarten is the third grade, increasing the amount of a CSF serving consumed by 42.7% (5) and the amount of a Rajma serving consumed by 36.3% (6). An increase in one year in age is also associated with an 0.8% increase in the probability of WABG selection (4) and a 0.7% increase in the amount of a CSF serving consumed (7). Figure 4 shows that the largest increase in grade's effect on CSF selection occurs from

the second to third grade.[36]

[36] The coefficient on 3rd grade is significantly different from the coefficient on 2nd grade at the 10% level.

Figure 4. Effect of Grade on CSF Selection and Consumption



Race sometimes has a statistically significant effect, depending on the outcome and specification being modeled. When significant, race effects are consistent with each other. Black relative to White has negative effects in four of the six observational data analyses in which it is included. Race effects on consumption outcomes are also larger than those on selection outcomes. Black relative to White significantly decreases the probability of selecting CSF by 1.7% (model 1), decreases the probability of selecting WABG by 2% (4), decreases the amount of a CSF serving consumed by 17.2% (5) and decreases the amount of a Rajma serving consumed by 16.9% (6). Asian relative to White only significantly increases the probability of selecting CSF by 3.5% in the multinomial logistic regression framework (2). Other relative to White significantly increases the amount of a CSF serving consumed by 18.3% (model 5) and the amount of a Rajma serving consumed by 23.8% (6).

Sex, specifically being female relative to male, has a statistically significant effect on the log odds of selecting bagel with melted cheese relative to no entrée or leftovers, increasing the probability of selecting bagel with melted cheese by 3.3% (model 2). Female relative to male also increases the probability of selecting WABG by 2.6%.

Entrée effects are found in all selection and consumption analyses in which entrée (Rajma vs. WABG) is included as a control: model 1, the CSF equation of model 2 and model 5. Entrée effects were stronger on CSF consumption than that on selection. Rajma relative to WABG increases the probability of selecting CSF by a range of 5.2 to 5.8% (5.2% in model 1 and 5.8% in model 2), but Rajma relative to WABG increases the amount of a CSF serving consumed by 16.3% (5).

The number of high-popularity leftover food items offered has a statistically

significant effect on the probability of CSF selection in the main and multinomial logistic regression framework (models 1 and 2), but not the entrée-specific models (3 and 4). The number of high popularity leftover items served is associated with a statistically significant decrease in the log odds of CSF selection, depressing the probability of selection by 2.5%, as expected.

Lunch period duration only has a statistically significant effect on Rajma consumption (model 6). A five-minute increase in lunch period duration significantly increases the amount of a Rajma serving consumed by 15%.

4.6 Other Factors: Survey

Fifth grade relative to third grade sometimes has a statistically significant effect on knowledge outcomes and liking outcomes. Specifically, fifth grade relative to third grade increases the probability of having increased knowledge of what Rajma is by 19.8% (model 10 in Table 14 in Appendix A) and of what CSF is by 3.3% within the control group (14). Fifth grade relative to third grade decreases the probability of having an improved perception that the respondent's peers like CSF by 23.8% (18).

White relative to non-white is the only racial and ethnic category included as covariate in the survey data analyses. When significant, White is positively associated with various outcomes relative to non-white. White relative to non-white increases the probability of having increased knowledge of what Rajma is by 8.3% (model 8). White relative to non-white also decreases the probability of never having sampled Rajma, or increases the probability of having sampled Rajma by 10.7% (30).

Female relative to male increases the probability of having increased knowledge of what Rajma is by 10.9% (model 10).

Eating school lunch regularly is significantly and positively associated with: knowledge outcomes in the alternative framework (models 9, 11 and 13); liking of WABG; belief that posters and signs increased willingness to try CSF (25); and sampling indicators (30-31). These results are in line with expectations, as the interventions targeted the population of students that eat school lunch.

Vegan/vegetarian is never statistically significant. This result may suggest that the interventions reach a broader population than those who eat CSF only because it is their only option permitted by dietary restrictions.

CHAPTER 5

5 Discussion

As an overview, the evidence from this study does not unconditionally support H1 ("Increased Demand"), that the interventions increased demand for CSF. There is, however, evidence that the interventions increased demand for Rajma after the second round of interventions. Neither does evidence support H2 ("Increased Consumption"), that the interventions increased CSF consumption. The evidence gathered from the survey is more favorable. There is support for H3 ("Increased Knowledge") and H5 ("Increased Sampling"), and mixed evidence in support of H4 ("Improved Attitudes"). The interventions increased knowledge of CSF, increased liking of CSF among those who had not tried it before and increased the probability that students sampled CSF. The interventions did not prove to significantly impact liking of CSF among those who had already tried it and did not impact perceptions of CSF's healthfulness.

5.1 Selection and Consumption Outcomes (H1 through H2)

While the evidence of the interventions' impact on demand is not conclusive, the interventions seem to positively impact potential precursors to demand, like knowledge and taste exposure, which should increase familiarity with CSF dishes. It was noted that many children didn't have time to try their samples before they made their selection due to the fast-paced nature of the lunch line. In-line tastings may thus have a lagged effect on demand, influencing selection on subsequent days on which the entrée is offered

instead of the same day of the in-line tasting.

Two factors that might have inhibited increased consumption during this study were the ability to take multiple samples, of which at least a few children took advantage, and large samples. Some samples were large because the sampling cups provided were large. By taking up a smaller portion of the cup, the samples may not have been as visually appealing. The large samples may have also induced "sensory-specific satiety" (Rolls et al. 1981a), whereby children lose the taste for a food they more they consume of it. Empirical supporting the concept of "sensory-specific satiety," a study on the impact of serving a small portion of raw vegetable in the lunch line on vegetable consumption found that the majority of consumption came from portions served in-line but total vegetable intake on a student-level during lunch was low (Elsbern et al. 2016). It is possible that serving samples in line had a similar effect on CSF consumption.

Since the interventions were only implemented twice with Rajma, and repeat exposure may start to play a role only in subsequent exposures, this analysis is only a glimpse into the potential effect of repeat exposure. The interventions may produce a clearer and larger effect on CSF demand and consumption as a whole upon later replications. On the other hand, since tastings of Rajma and WABG have previously occurred, tastings may not be novel experiences for all students sampled in this study. It is unclear where in the succession of tastings this study falls. Since the last in-line tasting actually occurred with Rajma in one of the schools in this study less than two years ago, and a higher number of CSF meals were recorded as selected during that tasting than during an observation date in this study, it is possible that Rajma is already experiencing diminishing returns to tastings in that one school. Diminishing returns, however, does not

obviate any returns and the combination of tastings with other promotional activities may produce a distinct effect than that produced by tastings alone.

5.2 Survey Outcomes (H3 through H9)

The survey data generally indicates that the treatment had a statistically significant and positive effect. The interventions positively impacted the following outcomes of interest: knowledge of CSF, Rajma and WABG; sampling of Rajma and WABG during the study; and liking of CSF and Rajma among those students who had not tried CSF previously, suggesting that children who had never tried CSF tried CSF during the intervention period and liked it. Changes in taste preferences, i.e. in liking among those students who had already tried CSF, and perceptions of CSF's healthfulness did not occur as a result of the interventions. Research indicates that repeat exposure is necessary to induce liking of previously disliked food, and students were only exposed to an entrée at most twice through the interventions. Thus, it may not be surprising that changes in taste preferences did not occur within the study's scope. While recognition of CSF as healthy may be important in long-term consumption of CSF, perceptions of healthfulness may not be as critical to children's food choice as familiarity, exposure or liking. See subsection "Script Variations in Announcements" under "Strengths, Limitations and Directions for Future Research" for an explanation.

In regards to the hypotheses about post-only outcomes, excluding H5 ("Increased Sampling"), there is clear evidence for H6 ("Awareness of Interventions") and H8 ("Changed Perception of the Most Effective Intervention") and mixed evidence for H7 ("Increased Willingness to Try CSF").

Students appear to take correctly note of the interventions. Students in the treatment group noticed the interventions significantly more than students in the control group, mitigating concerns about false memories of their existence. Satisficing also does not explain these findings; there is no reason to expect that one treatment group would engage in satisficing more than the other. While indicators of awareness of the interventions provides support the idea that students were actually "treated," awareness of the interventions is neither a necessary nor sufficient condition for their effectiveness.

Increased willingness to try CSF due to the announcements and not the posters and signs contrasts with students' perceptions of the most effective promotional tool. A higher percentage of survey respondents said posters and signs made them want to try CSF compared to announcements. If these interventions continue to be implemented, it should be kept in mind that changing the recipe-sign posters and signs to match the recipe offered that day may require cooperation from foodservice staff, and that CSF program staff may need to send reminders for morning announcements, also noted by Baker (2015).

Results for H9 ("Increased Knowledge due to Survey") provide evidence that the survey acted as an unintentional but effective means of providing information about Rajma.

5.3 Secondary Two-Way Analyses

The results for (1), (2) and possibly (3) provide some indication for success with the study's objectives of increasing knowledge about CSF and encouraging students to try CSF. (5) indicates that knowledge of CSF may play a role in whether students try

CSF, while the results for (4) do not provide evidence that sampling can be explained by increased knowledge of CSF. (7) and (8) signal that familiarity and liking may indeed be linked, although the results for (9) through (11) are surprising given the literature associating neophobia, liking and food acceptance. Consistent with other analyses throughout this paper, (1), (3) and (8) indicate that Rajma relative to WABG produces stronger effects.

5.4 Profile of CSF Consumers: Grade, Race and Sex Effects

Other studies that have found age effects on health-related outcomes advance potential explanations for the differential effects of grade found on selection and consumption outcomes, specifically that older graders seem more likely to choose or consume CSF. Younger children may be more deterred by unfamiliar or visually unappealing food. Zeinstra, Koelen, Kok, and de Graaf (2007) found that younger children (ages four to five respond to sensory properties of fruits and vegetables, like appearance and texture, whereas older children (ages 11-12) respond more to taste and social factors.[37] Pagliarini, Gabbiabini and Ratti (2005) found that older children (ages eight - 10) and younger children (age seven) differed in their food preferences. They also found that older children are generally more aware of their preferences and critical in their choices relative to younger children who rated foods on average as more acceptable than older children. The demarcation between these two age groups is worth noting since age seven roughly corresponds to second graders and ages eight to 10

[37] It is worth nothing that Zeinstra et al.'s (2007) study was limited to a very small sample of twenty-eight children.

corresponds to third to fifth graders, which may potentially explain the jump between second and third graders in Figure 4. In line with this discussion, it would be interesting to test whether there are interactions between grade and entrée. It is important to note that since the survey was only administered to students in higher grades, third and fifth graders, the grade effects found in the survey data analyses are distinct from those found in the observational data analyses, in which grade effects are inferred relative to kindergarteners.

In regards to race effects, there are not enough South Asian or Hispanic children in either the observational or survey dataset to infer whether preexisting familiarity with Rajma or beans had systematic effects on the various outcomes of interest. It was noted that a few students took pride in their common heritage with the entrées offered, specifically South Asians with Rajma, and African Americans with WABG. While the literature on familiarity may suggest that children want familiar foods, shared heritage may not necessarily predispose children to select or consume CSF; children may also want to try something different from what they eat at home. Indeed, the NACP report (Horn, 2017) and Baker's evaluation (2015) note that students also desire variety and novelty. The NACP report also noted that race and income may interact in the county of interest, but it is worth pointing out that this study cannot uncover these interactions because income data was not collected. In other words, race effects cannot be disentangled from income effects in this study.

When the effect of being female is statistically significant, it is always positive. This suggests that there might be a larger effect at play, though the mechanism of this effect is not clear in this study. Neither does there seem to be a systematically consistent

effect in other studies. For example, Hanks, Just and Brumberg (2016) report that relevant literature provides mixed evidence of sex effects in behavioral responses to interventions. Their own results also contribute to the mix of evidence; they find that students of different sex respond differently to marketing interventions involving branded media, but that these responses are not clearly consistent with each other.

The profile of CSF consumers in this study roughly shadows the profile of CSF consumers in Baker's observational dataset (2015), from which it seems that older, Asian and female students are more likely to select CSF. 53% of those who selected CSF are 4th or 5th graders and 31% are 2nd or 3rd graders. 50% are Asian and 64% are female. Baker's sample includes four schools, two of which are included in this study, but is much smaller, consisting of 36 students.

5.5 Entrée-specific effects

The differences in effect between Rajma and WABG in both the observational data and survey data analyses suggests that the treatment effect depends on food being targeted. This conclusion about the specificity of the impact of promotional efforts to the food in question is consistent with the previous CSF program evaluation in which it is stated that students' satisfaction levels with CSF dishes vary by entrée (Baker, 2015). It is also consistent with other studies demonstrating that repeat exposure may be more effective for certain foods more than others (Zeinstra, Vrijhof, & Kremer, 2018).

One reason that WABG may be relatively unpopular, as noted by food service staff and data collectors in this study, is that it contains kale and visible chunks of vegetables that may deter children from liking or eating it. Rajma, however, has been

offered many times more than WABG, and thus it is difficult to identify whether liking or familiarity better explains entrée effects. The stronger treatment effects, sometimes more pronounced, sometimes larger, on knowledge outcomes for Rajma compared with WABG is especially curious since the amount of information provided through the study was the same for each entrée. Perhaps the students' relative preference for Rajma and/or preexisting familiarity with Rajma interacted with the treatment to give rise to these effects. Since Rajma and WABG are examples of CSF, the differences in effects on knowledge of CSF relative to knowledge of Rajma and WABG indicate that recognition of these two entrées as CSF recipes is still lacking. If so, promotional efforts could focus on improving recognition of CSF as a brand, which could, in turn, induce positive spillover effects on entrée-specific goals.

CHAPTER 6

6 Strengths, Limitations and Directions for Future Research

The following directions for future research proposed are based on the observations made during the study and by CSF staff and food service staff. They are also based on the study's own strengths and limitations.

6.1 Design-specific Recommendations

6.1.1 Size and Sample

The fact that all four schools in this study are within one school district is both a strength and limitation. It is a strength because the school district offers the same core menu of food options to all the schools within the district. However, entrées similar to CSF are still not widely available, and findings from this study may not apply to the choice set of entrées offered in most elementary schools. Moreover, while the four schools were most similar among all the elementary schools in the district in terms of racial and income composition, differences still exist that could be minimized by including schools outside the district. Even within the district, Baker (2015) notes that the effectiveness of taste tests may vary across schools. Enlarging the sample of schools by increasing the number of schools included would also strengthen inference by increasing the number of clusters and ultimately the study's power.

6.1.2 Alternate Data Collection Procedures and Other Design Elements

The use of a pre-post survey in addition to observational data is another strength of this study. The observational data gives a broad understanding of consumption behavior during lunch while the survey gives a more in depth understanding of the factors that may drive demand for CSF. Concerns about response bias due to social desirability are mitigated by the fact that between and within-subject analyses are made from surveys that were exactly the same for all respondents within and across control and treatment schools. There is no known reason to believe that one treatment group experienced changes in social desirability concurrently with the intervention's implementation. There were, however, survey questions that asked about the respondent's past behavior, such as those pertaining to H7 ("Awareness of Interventions") and H8 ("Increased Willingness to Try CSF"), that may be subject to recall bias.

The lack of panel data or the inability to link the observational and survey datasets is a limitation. The lack of panel data limits the study's power. Panel data could also provide information on repeat purchase behavior. On the other hand, collecting panel data would require active parental consent and likely result in significantly smaller sample. Trade-offs between the costs and benefits of collecting panel data in future studies would have to be made on a case-by-case basis. The simplicity, minimally-intrusive nature of this study likely contributed to its ease of approval, which was an advantage given the restricted number of observational dates available for inclusion in the study in the first half of the school year.

Additionally, obtaining observational data that tracks who takes or tries samples would enable a more precise understanding of the impact of samples on children's food choices. Without information on samples, the treatment indicator can partially be thought of an intent-to-treat indicator. On this note, given the "rareness" of CSF selection, it may be worthwhile to collect more detailed information on all CSF consumers possible, such as sampling information, and a random sample of non-consumers. This data collection process, in combination with a correction for selection on the dependent variable, is suggested by King and Zeng (2011) in their paper on logistic regression with rare events.

6.2 CSF- and Site-specific Recommendations

6.2.1 Progress Monitoring

Reiterating Baker (2015)'s recommendations, the CSF program would benefit creating a percentage goal for student uptake and monitoring progress toward this goal. Monitoring progress would require selection data, however, and daily production records were not found to be reliable sources for this data. At least for CSF during the observation dates in this study, comparisons between production records and data collected revealed large discrepancies, both in terms of trends and absolute numbers of portions served of CSF. The fast-paced nature of the lunch line may make it difficult for cafeteria managers to keep accurate records. Alternatively, progress can be monitored by taking a simply tally during tastings or taste-tests a few times a year.

6.2.2 Menu Modification and Development

Children may decide not choose CSF even after they realize they like it. For example, one student stated in surprised, "This is good!" after trying the sample, but then proceeded to order a grilled cheese. Children may like CSF dishes but not more than their alternatives, especially when their alternatives are popular food items. In fact, the food service director deliberately paired CSF entrées with a hit item to ensure sufficient sales of school meals. Excluding grilled cheese, the other entrées were comparable in their popularity with CSF; selection of these other entrées can be viewed as a "rare event" alongside selection of CSF. Thus, demand for CSF may significantly rise when CSF is paired with a less popular item. Pairing CSF with positive trigger foods, foods that trigger selection of healthy à la carte items like CSF without being selected themselves, may similarly increase demand (Hanks, Just, & Wansink, 2012). The food service director also stated in an interview that students were not willing to take vegetables until they knew entrée was being offered.[38] Thus, the composition of the school meal may depend on the choices offered that day for each meal component.

Certain recipes are bound to more liked than others. A threshold for baseline popularity could be determined, such that only recipes that pass this threshold are menued. This could make better use of resources available for recipe-specific promotion, while achieving the CSF program's objective of increasing consumption of healthy, plant-based and internationally-inspired entrées. Similarly, Baker suggested improving existing recipes, eliminating the least popular recipes and creating more kid-friendly recipes (2015).

[38] Reference omitted to preserve anonymity of school district.

6.2.3 Aesthetic Appeal and Other Consumption-specific Factors

In order to effectively increase food intake among consumers of CSF, future interventions may need to leverage consumption-specific behavioral factors. Factors like lunch period duration, whether or not recess precedes lunch, convenience and accessibility may affect consumption of CSF as well as of other foods (Cohen et al., 2016; DeCosta, Møller, Frøst, & Olsen, 2017; Price & Just, 2015; Rasmussen et al. 2006). Indeed, the NACP report suggests that lunch period duration may have an important impact on consumption in the schools in the study's county (Horn, 2017). Ten percent of students that participated in research for the report claimed they did not have enough time to eat. Short lunch periods and small portion sizes may explain report findings that school lunch leaves about 14 percent of children hungry. The cafeteria environment, including noise, bright lighting and excessive commotion, may additionally influence consumption (Smarter Lunchrooms Movement, 2018; Horn, 2017).

Factors that are specific to CSF, such as its visual appeal and ease of consumption (Swanson, Branscum, & Nakayima, 2009) could also be manipulated in future promotional efforts to increase CSF consumption. Several comments by a cafeteria managers suggested that the visual appeal of the food items offered may affect children's preference for it, although the importance of visual appeal may vary by age (Coulthard, Palfreyman, & Morizet, 2016). One cafeteria manager advised making CSF look more consistent and appealing to children by improving color or texture (Baker, 2015). Entrées like WABG in which there are visible chunks of vegetables like sweet potatoes and greens may not be appealing to children for aesthetic and/or taste reasons. A previous CSF manager and food service staff mentioned that they try to remember to chop the

vegetables into smaller pieces. It could be the case that these chunks were more visible in the full-sized entrées than they were in the samples, possibly explaining the negative associations between the treatment and WABG consumption.

6.2.4 Varying Serving Size Options: Samples, Sides and Half-Portions

Depending on the goal of the tasting, it may be worth exploring whether limiting the number of samples and moderating the size of the samples may nudge children to select or consume CSF. Multiple samples and large samples may have reduced demand for CSF as an entrée. Offering samples of CSF regularly in line or as sides or half-portions may increase consumption of CSF, if not its selection as an entrée. Some children may choose CSF if it is offered it as a side or a half-portion, which allows them to choose another entrée as well. For example, a student could choose a half-portion of CSF and half a grilled cheese. This way he or she can have the "best of both worlds," logic that was relayed by some data collectors during the tastings when observing children who seemed to like CSF samples but chose something else as their main entrée. Such behavior might demonstrate rational choice, by which children choose bundles of goods that vary in size to optimize their utility, obtained in this context by variety.[39] Providing CSF as a default side or sample may further increase selection (Price & Riis, 2012), though the costs of these additional servings will have to weighted against the benefits. It was also observed that on occasion some children only took beans or rice. Children may have a preference for consuming these ingredients

[39] A study on rational choice in children found that even the youngest children exhibit rational choice behavior at least some of the time (Harbaugh, Krause, & Berry, 2001). It also found that the number of revealed preference violations decreases from age 7 to 11. See Just et al. (2012) and Rolls et al. (1981b) for references for children's preference for variety.

separately rather than mixed together (Cashdan, 1998). Thus, providing only the beans portion of the dish as an option may also satisfy children's palettes.

6.2.5 Varying the Script for Announcements

Using a script for the announcements that makes CSF sound more appealing, by emphasizing taste instead of providing information about its potential health or environmental benefits, might more effectively increase demand and consumption of CSF. A study in a university cafeteria found that labeling vegetables with "flavorful, exciting and indulgent descriptors" (Turnwald, Boles, & Crum, 2017) significantly increased the number of people choosing vegetables and the total mass of vegetables chosen. It also found no significant differences between simple descriptive and healthy labels, implying that healthy labels are not appealing to consumers. An experiment studying the effectiveness of different menus on proenvironmental food choice similarly found that a default menu increased the probability of selecting a meat-free meal option while neither information provision nor the proenvironmental value orientation and worldview did (Campbell-Arvai, Arvai, & Kaloff, 2012). In the context of this study, it could be useful to test out script variations emphasizing different categories of benefits to further understand which angles are most attractive to children. It would also be useful to survey recipients on not only perceptions of healthfulness of the target food, but also their taste perceptions of CSF and whether they view it as sustainable.

6.2.6 Recipe Distribution

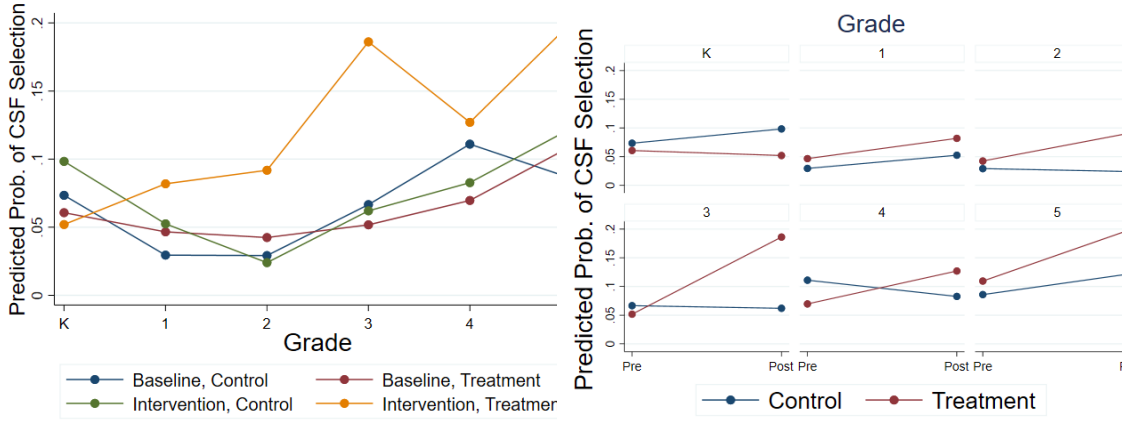
If recipes are handed out during tastings as was done in this study, it may be informative to track parent's knowledge of CSF and whether they tried making the recipe as a result through a short survey. Baker (2015) noted that parents generally would like having recipes and information about CSF sent home regularly in the form of hard copies. Some children were personally uninterested in the recipes but were interested in taking the recipes home to their parents. Younger children in particular may have been more drawn to the commotion surrounding recipe distribution rather than the recipes themselves.

6.3 Exploring and Leveraging Other Influences

6.3.1 Heterogeneous Treatment Effects Across Grade

It may be worth explicitly studying whether there are heterogeneous treatment effects across grade or age. Figure 5 below shows the results of a model with a three-way interaction between the treatment variables, period and group, and grade.

Figure 5. Treatment Effect by Grade



* These are based on a model with a three-way interaction between period, group and grade. This model results in more parameters than clusters, however. Hence, the standard errors may be questionable and confidence whiskers are removed. These graphs are to be used solely for exploratory purposes.

The graphs in Figure 5 reveal some potentially meaningful trends that should be further investigated. This study found that older students are more likely to select and consume CSF. This is consistent Figure 5 that shows that responsiveness to the treatment increases in grade. It was also observationally noted by researchers in this study that older kids are more likely to take samples. A previous CSF manager also recommended tailoring tasting strategies to the different age groups. When encouraging kids to try a sample, younger children may be more impressionable and more responsive to pitches of CSF as "cool" or to rhetorical questions in which they are asked, for example, “Who's brave enough to try something new?” On the other hand, younger children may be more unwilling to try new foods, as research has consistently demonstrated (Dovey et al., 2008). Interestingly, Figure 5 shows that kindergarteners may react negatively to the tastings, consistent with research that suggests food neophobia peaks between ages 2 and 6 (Dovey et al., 2008), and that third graders may be the most responsive to them. While older children may be more willing to try new foods, they may react negatively to appeals about coolness or bravery. They may also have relatively more well-defined preferences that are more difficult to change (Pagliarini et al., 2005). Grade effects, as well as race and sex effects, found in this study can be used as starting points for comprehending potential disparities in nutritional outcomes and approaches for customizing marketing strategies for different segments of the population.

6.3.2 Peer Influence

Peer influence was noted as significant in children’s behavior by the researchers in this study, a previous CSF manager and by students themselves. It was observed that

a child was much more likely to try a sample if another student in his or her vicinity tried and liked it. Perhaps students look to their peers for cues of how CSF tastes if they are unfamiliar with it. It was also observed that students were more likely to take a CSF recipe if his or her friends did. There was an open-ended question at the end of the survey where respondents could describe other factors that made them want to try CSF, and friends are among the most frequent of responses.

Literature has also highlighted the importance of engaging students and leveraging peer influence in promoting healthy eating (DeJesus, Shutts, & Kinzler, 2017; Gibson et al., 2012; O'Connell et al., 2012; Larson & Story, 2009; Smarter Lunchrooms Movement, 2018). For example, O'Connell et al. (2012) found that greater consumption by tablemates was a significant predictor of increased vegetable consumption. Subjects' intake was proportionally even larger than the intake of the subjects' peers at times; one gram of peer intake was associated with one to five grams of increased intake among the participants. DeJesus et al. (2017) also found social information, such as knowledge of preferences of peers or adults, to influence children's taste perception. More broadly, other studies have also found social influence and modeling to play significant roles in consumption behavior (DeCosta et al., 2017; Marty et al., 2018; Wardle & Cooke, 2013). It may be worth implementing and evaluating a program like a "CSF Ambassadors Program" in which interested students are assigned roles to help promote CSF during tastings in exchange for a small reward.

6.3.3 The Role of Cafeteria Managers

Cafeteria managers can significantly shape children's food choices. The food

service director of the school district of study noted that active customer service, including providing prompts, improved selection significantly and successfully encouraged children to try new items.[40] Other studies have also found simple verbal prompts to influence choices (Lai, List, & Samek, 2015; Perry et al. 2004; Schwartz, 2007; Schwartz et al., 2017). For example, Lai et al. (2015) found that a simple prescriptive prompt was just as effective as this prompt combined with taste or health information, implying that social pressure may dominate other influences. An evaluation of the Cafeteria Power Plus project found that verbal encouragement by food service staff was associated with increased fruit intake (Perry et al. 2004).

Cafeteria managers' own personal preferences, familiarity with the foods offered and perceptions of students' preferences may play a role in what suggestions they provide to students. Surveys previously administered to cafeteria managers in the school district indicated that cafeteria managers are willing to spend a small amount of time, about 20 minutes a week, to promote CSF by displaying signage and offering samples (Baker, 2015). Thus, it is important that nutritional campaigns have the support of food service staff.

[40] Reference omitted to preserve anonymity of school district.

CHAPTER 7

7 Conclusion

The tools evaluated in this study clearly and positively impacted correlates of demand, like knowledge, taste exposure through sampling and liking among new consumers of CSF, as well as demand for Rajma upon replication of the interventions. They did not conclusively demonstrate an effect on consumption of these entrées. These findings suggest that simple marketing tools like tastings, recipe-specific announcements and posters and signs can foster acceptance of healthy, plant-based entrées among children, but that their effectiveness may vary by entrée and frequency of exposure.

Tastings, recipe-specific announcements and posters and signs show promise for future use and study and should continue to be evaluated as promotional tools for healthy entrées. Dishes similar to those introduced through the CSF program are unfamiliar to many children, and these interventions are low-cost means of exposing children to new foods. Children cannot learn to like unfamiliar foods without opportunities to learn about them or try them. Furthermore, as school-wide interventions, these interventions reach a wide audience. Changes in tastes will most likely be made through repeat exposure and similar promotional efforts may be most effective when sustained over time. It may be premature to evaluate the interventions' success by studying their implementation only once or twice. More research should be carried out to better understand how to use these tools effectively, when to use them and where else to direct efforts.

This evaluation has provided groundwork for further investigation of children's acceptance of healthy, plant-based and ethnic entrées. Acceptance of these kind of entrées

may have important implications for human and environmental health and animal welfare, but the rate by which such foods are accepted will determine what implications their increased consumption have. Achieving multi-dimensional short- and long-term outcomes will ultimately require a multi-pronged approach that incorporates simple, low-cost activities like those evaluated in this study in addition to more involved ones like cooking, gardening and educational programs (DeCosta et al., 2017).

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APPENDIX A

Table 12. Selection Regression Results

	(1) CSF Selection Logit		(2) Entrée choice Multinomial Logit					(3) Rajma Selection Logit		(4) WABG Selection Logit	
			CSF equation		Bagel/MC equation		Whole model				
Variable	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**F statistic**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**
Female	0.170	0.012	0.079	0.012	0.675340 6**	0.033		0.060	0.005	.583*	0.026
	-0.71		0.232		2.187		4.184***	0.219		2.057	
Black	-0.190	-0.012	-0.752***	-0.017	-0.567	-0.002		-0.369	-0.028	.449*	0.020
	-0.95		-4.238		-1.503		3.779**	-1.398		1.948	
Asian	0.340	0.028	0.963***	0.035	0.555	0.003		0.289	0.028		
	-1.590		3.212		1.415		2.031	1.416			
Other	0.030	0.002	-0.008	0.009	-0.099	0.001		0.000	0.000		
	-0.140		-0.024		-0.230		0.396	-0.001			
Asian or Other										.335*	0.015
										0.791	
1st Grade	-0.110	-0.006	0.140	-0.005	-0.135	-0.015		-0.199	-0.014		
	-0.44		0.273		-0.146		1.207	-0.663			
2nd Grade	-0.250	-0.013	-0.302	-0.019	-0.529	-0.021		-0.398	-0.025		
	-0.83		-0.476		-0.562		1.366	-1.156			
3rd Grade	0.490	0.035	0.584	0.020	0.550	0.012		0.185	0.015		
	-1.150		0.618		0.543		1.411	0.547			
4th Grade	0.51*	0.036	0.470	0.028	0.326	0.012		0.501*	0.045		
	-2.110		1.109		0.429		2.218*	1.954			
5th Grade	0.87**	0.072	1.174*	0.058	0.967	0.027		0.822**	0.085		
	-2.580		1.916		0.882		1.984	2.346			
Age										.172*	0.008
										1.852	
Rajma	0.81***	0.052	0.892**	0.058	-0.048	-0.006					
	-3.580		2.832		-0.187		5.567***				
# of High Popularity Leftover Items Offered	-0.34**	-0.025	-0.793***	-0.020	-0.225	0.013		-0.302	-0.026	-1.118*	-0.049
	-2.65		-3.314		-0.963		5.095***	-1.565		-2.030	
Intervention Period	0.04	0.035	-0.188	-0.006	0.645	0.033				-.659	0.012
	0.28		-0.488		1.328		2.013			-0.808	
Treatment Group	-0.07	0.025	-0.782	-0.013	0.042	0.029		-0.254	0.010	.887*	0.070
	-0.24		-1.558		0.090		6.960***	0.483		1.940	
Intervention Period * Treatment Group	0.67	0.054	0.824	0.058	-1.023*	-0.047				1.141	0.043
	1.670		1.713		-1.787		2.387*			1.073	
1st Time Treated								0.004	0.040		
								0.011			
2nd Time Treated								0.165	0.043		
								0.788			
1st Time Treated * Treatment Group								0.730	0.065		
								1.423			
2nd Time Treated * Treatment Group								.534*	0.047		
								1.742			
Observations	3,060				3,016			2,065		995	
Clusters	18				18			18		18	

* Significance levels: * = p-value<0.1; ** = p-value<0.05; *** = p-value<0.001.
* Coefficient is reported in log odds; dy/dx = marginal effect as calculated by margins command in Stata.
* Marginal effects of interaction terms were computed using the contrasts commands in Stata.
* Standard errors are clustered at the grade-school level using a score-bootstrapping procedure with a finite sample correction implemented through the "boottest" command in Stata (Roodman 2018).
* t-statistics reported underneath coefficients.
* Base levels for: Race = White; Grade = Kindergarten; Entrée = West African Beans & Greens (WABG); Period = Baseline; Group = Control.

Table 13. Consumption Regression Results

	(5)	(6)	(7)
	CSF Consumption Linear	Rajma Consumption Linear	WABG Consumption Linear
Variable	**Coef.**	**Coef.**	**Coef.**
Female	-0.021	0.011	
White			0.055
Black	-0.172**	-0.169**	
Asian	-0.052	-0.054	
Other	-0.183***	-0.238***	
1st Grade	-0.041	-0.124	
2nd Grade	0.156	0.166	
3rd Grade	0.427***	0.363**	
4th Grade	0.352**	0.351*	
5th Grade	0.472***	0.454**	
Age			.071**
Ms. Patel's Rajma	0.163**		
# of Items on Tray	0.012	0.007	
Intervention Period	0.067	0.083	0.062
Treatment Group	-0.005	0.007	-0.028
Intervention Period * Treatment Group	-0.103	-0.109	-0.161
Lunch Period Duration	0.126	0.153**	
Serving Size (25 g)	-0.033	-0.019	
Observations	221	183	39
Clusters	18	18	13
R-squared	0.290	0.286	0.162

* Significance levels: * = p-value<0.1; ** = p-value<0.05;
*** = p-value<0.001.
* Standard errors are clustered at the grade-school level using a wild-bootstrapping procedure available as an option through the user-written command "clustse " in Stata (Menger 2017).
* t-statistics reported underneath coefficients.
* Base levels for: Race = White; Grade = Kindergarten;

Table 14. Regression Results for Pre-Post Outcomes: Knowledge and Perception of Healthfulness

	(8) Increased Knowledge of CSF Logit		(9) Knowledge of CSF Ordinal logit Alternate specification		(10) Increased Knowledge of Rajma Logit		(11) Knowledge of Rajma Ordinal Logit Alternate specification		(12) Increased Knowledge of WABG Logit		(13) Knowledge of WABG Ordinal Logit Alternate specification		(14) Knowledge of CSF: Control Group Ordinal Logit		(15) Knowledge of Rajma: Control Ordinal Logit		(16) Knowledge of WABG: Control Ordinal Logit		(17) Perception of CSF's Healthfulness Ordinal Logit Alternate specification		
Variable	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx (Good)**	**dy/dx (Really Good)**
Female	0.009	0.002	-0.126	-0.021	.639*	0.109	0.318	0.040	-0.032	-0.005	-0.527	-0.089	-0.310	0.069	0.794	0.069	-0.356	-0.049	-0.085	-0.003	-0.015
	0.0262		-0.536		2.132		0.968		-0.056		-1.712		-0.764		1.307		-0.881		-0.487		
White	.462*	0.083	0.151	0.025	0.319	0.055	0.504	0.064	0.430	0.071	0.170	0.029	0.157	0.023	0.261	0.023	-0.046	-0.006	.780***	0.027	0.139
	2.271		0.938		0.335		1.290		1.394		0.672		0.558		0.344		-0.137		5.286		
5th Grade	-0.222	-0.040	.551**	0.091	1.158*	0.198	0.554	0.071	0.137	0.023	0.375	0.064	.378*	0.034	0.385	0.034	0.245	0.034	.764*	0.026	0.136
	-0.775		2.790		2.439		1.549		1.218		1.701		2.776		0.563		0.736		2.191		
School-luncher	-0.103	-0.019	.695**	0.115	-0.504	-0.086	.861**	0.110	0.369	0.061	.744***	0.126	0.606	0.041	0.468	0.041	.688**	0.095	.423*	0.015	0.075
	-0.227		3.210		-0.979		2.493		0.539		3.827		2.260		0.733		5.037		2.186		
Intervention Period			0.444	0.074			0.936	0.119			-0.340	-0.058	0.462	0.088	1.009**	0.088	-0.315	-0.044	-0.561	-0.019	-0.100
			1.603				1.893				-1.287		2.037		3.644		-1.208		-1.407		
Treatment Group	2.199***	0.394	.636**	0.106	2.505***	0.428	.834*	0.106	1.951***	0.324	0.035	0.006							0.516	0.018	0.092
	7.767		2.600		3.759		2.354		7.257		0.144								1.516		
Intervention Period * Treatment Group			1.953***	0.324			2.048***	0.261			2.222***	0.376							0.808	0.028	0.144
			7.025				3.910				7.613								1.479		
Observations	132		411		134		414		132		409		198.000		199.000		200.000		225		
Clusters	7		8		7		8		7		8		4.000		4.000		4.000		8		

* Significance levels: * = p-value<0.1; ** = p-value<0.05; *** = p-value<0.001;
* Coefficient is reported in log odds; dy/dx = marginal effect as calculated by margins command in Stata.
* Marginal effects of interaction terms were computed using the contrasts commands in Stata.
* Standard errors are clustered at the grade-school level using a score-bootstrapping procedure with a finite sample correction implemented through the "boottest" command in Stata (Roodman 2018).
* t-statistics reported underneath coefficients.
* Base levels for: Race = White; Grade = Kindergarten; Entrée = West African Beans & Greens (WABG); Period = Baseline; Group = Control.

Table 15. Regression Results for Pre-Post Outcomes: Liking

	(18)		(19)			(20)			(21)			(22)			(23)		
	Improved Perception of Friends Liking CSF		Perception of Friends Liking of CSF			Liking Beans			Liking CSF			Liking Rajma			Liking WABG		
	Logit		Ordinal Logit			Ordinal Logit			Ordinal Logit			Ordinal Logit			Ordinal Logit		
			Alternate specification			Alternate specification			Alternate specification			Alternate specification			Alternate specification		
Variable	**Coef.**	**dy/dx**	**Coef.**	**dy/dx (Like)**	**dy/dx (Love)**	**Coef.**	**dy/dx (Like)**	**dy/dx (Love)**	**Coef.**	**dy/dx (Like)**	**dy/dx (Love)**	**Coef.**	**dy/dx (Like)**	**dy/dx (Love)**	**Coef.**	**dy/dx (Like)**	**dy/dx (Love)**
Female	-0.061	-0.011	-.396*	-0.048	-0.045	0.314	0.012	0.055	0.199	0.022	0.025	0.359	0.011	0.068	0.081	0.007	0.010
	-0.094		-2.162			1.077			0.894			0.925			0.242		
White	0.047	0.008	-0.058	-0.007	-0.007	-0.026	-0.002	-0.004	.843*	0.095	0.104	0.307	0.009	0.058	-0.152	-0.013	-0.019
	0.082		-0.481			-0.110			2.213			0.822			-0.350		
5th Grade	-1.329*	-0.238	-.528**	-0.064	-0.061	0.198	0.012	0.035	0.341	0.038	0.042	0.482	0.015	0.091	0.128	0.011	0.016
	0.056		-2.888			1.026			1.443			1.186			0.395		
School-luncher	-0.494	-0.089	0.000	0.000	0.000	0.092	0.006	0.016	0.576	0.065	0.071	0.364	0.011	0.069	.405*	0.035	0.050
	-1.146		0.002			0.307			1.644			0.987			2.324		
Intervention Period			0.235	0.028	0.027	-0.119	-0.007	-0.021	0.024	0.003	0.003	0.198	0.006	0.037	-0.366	-0.031	-0.045
			1.023			-1.022			0.128			0.454			-1.579		
Treatment Group	0.676	0.121	-0.105	-0.013	-0.012	0.149	0.009	0.026	0.279	0.031	0.034	1.042*	0.032	0.196	0.633	0.054	0.078
	0.975		-0.365			0.848			1.061			2.173			1.712		
Intervention Period * Treatment Group			0.378	0.045	0.043	-0.052	-0.003	-0.009	0.044	0.005	0.005	0.358	0.011	0.067	0.582	0.050	0.072
			0.607			-0.204			0.089			0.594			1.149		
Observations	107		359			417			230			167			176		
Clusters	7		8			8			8			8			8		

* Significance levels: * = p-value<0.1; ** = p-value<0.05; *** = p-value<0.001;
* Coefficient is reported in log odds; dy/dx = marginal effect as calculated by margins command in Stata.
* Marginal effects of interaction terms were computed using the contrasts commands in Stata.
* Standard errors are clustered at the grade-school level using a score-bootstrapping procedure with a finite sample correction implemented through the "boottest" command in Stata (Roodman 2018).
* t-statistics reported underneath coefficients.
* Base levels for: Race = White; Grade = Kindergarten; Entrée = West African Beans & Greens (WABG); Period = Baseline; Group = Control.

Table 16. Regression Results for Post-Only Outcomes: Sampling, Awareness of Interventions and Perceptions of their Effectiveness

	(24)		(25)		(26)		(27)		(28)		(29)		(30)		(31)	
	Remembered Announcements Ordinal Logit		Posters & Signs Increased Willingness to Try CSF Ordinal Logit		Announcements Increased Willingness to Try CSF Ordinal Logit		Noticing Posters & Signs Ordinal Logit		Rajma Samples Increased Willingness to Try Rajma Ordinal Logit		WABG Samples Increased Willingness to Try WABG Ordinal Logit		Never Sampled Rajma Logit		Never Sampled WABG Logit	
Variable	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**	**Coef.**	**dy/dx**
Female	-0.337	-0.045	-0.085	-0.010	-.651*	-0.082	-0.318	-0.024	1.453 **	0.281	0.587	0.130	0.582	0.107	0.415	0.080
	-0.892		-0.224		-2.344		-0.911		2.464		1.431		1.446		1.396	
White	0.025	0.003	0.172	0.021	-0.130	-0.016	-0.303	-0.023	0.377	0.073	0.117	0.026	-.579**	-0.107	-0.167	-0.032
	0.076		0.282		-0.314		-0.788		0.349		0.137		-2.487		-0.483	
5th Grade	0.547	0.073	-0.394	-0.048	-0.822	-0.103	0.137	0.011	-0.008	-0.002	-0.109	-0.024	-0.169	-0.031	-0.198	-0.038
	1.744		-0.879		-1.617		0.317		-0.015		-0.375		-0.676		-0.633	
School-luncher	0.469	0.062	1.059***	0.130	0.333	0.042	0.524	0.040	-0.668	-0.129	0.908	0.201	-1.551**	-0.286	-1.506***	-0.290
	1.761		4.296		0.889		0.861		-1.069		0.745		-3.405		-3.741	
Vegan / Vegetarian	0.208	0.028	0.393	0.048	0.050	0.006	-0.138	-0.011	0.318	0.062	-0.088	-0.019	-0.787	-0.145	-0.458	-0.088
	0.709		0.591		0.092		-0.391		0.463		-0.140		-1.476		-1.794	
Treatment Group	3.470***	0.462	1.096	0.134	.999*	0.126	4.807***	0.369	1.688	0.326	0.862	0.191	-1.601***	-0.295	-1.323***	-0.255
	8.317		1.526		1.976		9.420		1.483		1.832		-5.536		-3.839	
Observations	148		86		90		147		55		55		147		147	
Clusters	7		7		7		7		7		7		7		7	

* Significance levels: * = p-value<0.1; ** = p-value<0.05; *** = p-value<0.001;
* Coefficient is reported in log odds; dy/dx = marginal effect as calculated by margins command in Stata.
* Marginal effects of interaction terms were computed using the contrasts commands in Stata.
* Standard errors are clustered at the grade-school level using a score-bootstrapping procedure with a finite sample correction implemented through the "boottest" command in Stata (Roodman 2018).
* t-statistics reported underneath coefficients.
* Base levels for: Race = Non-white ; Grade = 3rd Grade; Diet = Non-vegan / non - vegetarian; Group = Control.

Table 17. Sex Composition by School

School	Male	Female	Total
C1	188	252	440
	42.73	57.27	100
	5.99	8.03	14.02
C2	351	425	776
	45.23	54.77	100
	11.19	13.54	24.73
T1	381	314	695
	54.82	45.18	100
	12.14	10.01	22.15
T2	592	635	1,227
	48.25	51.75	100
	18.87	20.24	39.1
Total	1,512	1,626	3,138
	48.18	51.82	100
	48.18	51.82	100

* Source: Observational dataset.
* Schools C1 and C2 are control schools, and schools T1 and T2 are treatment schools. In each cell, frequency is listed first, then percentage for each school and, lastly, percentage of the entire dataset.

Table 18. Race Composition by School

School	White	Black	Asian	Other	Total
C1	145	75	111	109	440
	32.95	17.05	25.23	24.77	100
	4.65	2.4	3.56	3.49	14.1
C2	571	82	32	90	775
	73.68	10.58	4.13	11.61	100
	18.3	2.63	1.03	2.88	24.83
T1	341	221	9	123	694
	49.14	31.84	1.3	17.72	100
	10.93	7.08	0.29	3.94	22.24
T2	502	134	459	117	1,212
	41.42	11.06	37.87	9.65	100
	16.08	4.29	14.71	3.75	38.83
Total	1,559	512	611	439	3,121
	49.95	16.4	19.58	14.07	100
	49.95	16.4	19.58	14.07	100

* Source: Observational dataset.
* Schools C1 and C2 are control schools, and schools T1 and T2 are treatment schools. In each cell, frequency is listed first, then percentage for each school and, lastly, percentage of the entire dataset.

Table 19. Grade Composition by School

	Grade						
School	**K**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
C1	0	0	114	108	160	58	440
	0	0	25.91	24.55	36.36	13.18	100
	0	0	3.6	3.41	5.05	1.83	13.88
C2	150	113	101	102	163	166	795
	18.87	14.21	12.7	12.83	20.5	20.88	100
	4.73	3.56	3.19	3.22	5.14	5.23	25.07
T1	124	133	125	132	143	75	732
	16.94	18.17	17.08	18.03	19.54	10.25	100
	3.91	4.19	3.94	4.16	4.51	2.37	23.08
T2	248	196	176	189	229	166	1,204
	20.6	16.28	14.62	15.7	19.02	13.79	100
	7.82	6.18	5.55	5.96	7.22	5.23	37.97
Total	522	442	516	531	695	465	3,171
	16.46	13.94	16.27	16.75	21.92	14.66	100
	16.46	13.94	16.27	16.75	21.92	14.66	100

* Source: Observational dataset.
* Schools C1 and C2 are control schools, and schools T1 and T2 are treatment schools. In each cell, frequency is listed first, then percentage for each school and, lastly, percentage of the entire dataset.

Table 20. Survey Summary Statistics:
Demographic and Individual Characteristics

School	Freq.	Percent
C1	101	25.38
C2	83	20.85
T1	99	24.87
T2	115	28.89
Total	398	100

Grade	Freq.	Percent
3	229	57.54
5	169	42.46
Total	398	100

Age	Freq.	Percent
6	1	0.25
7	1	0.25
8	179	44.97
9	47	11.81
10	148	37.19
11	22	5.53
Total	398	100

Race	Freq.	Percent
Asian	26	8.47
Black	33	10.75
Hispanic-alone	10	3.26
Middle Eastern or North African	4	1.30
Mixed	39	12.70
Native American	5	1.63
Other	32	10.42

Diet: Pre	Freq.	Percent
None	256	74.42
Other	59	17.15
Vegan/vegetarian	29	8.43
Total	344	100

Diet: Post	Freq.	Percent
None	149	72.68
Other	43	20.98
Vegan/vegetarian	13	6.34
Total	205	100

Table 21. Survey Summary Statistics by Period (if Applicable)

Variable	Obs,	Mean	Std. Dev.	Min	Max
Frequency of Lunch Consumption: Pre	353	1.858357	0.7886227	1	3
Frequency of Lunch Consumption: Post	215	1.84186	0.7872324	1	3
Happiness with School Lunch Options: Pre	343	3.03207	1.018322	1	5
Happiness with School Lunch Options: Post	204	3.063725	1.064824	1	5
Importance of Healthy Food to Self: Pre	352	4.142045	1	1	5
Importance of Healthy Food to Self: Post	209	3.899522	1	1	5
Liking Trying New Foods: Pre	350	3.445714	1.100233	1	5
Liking Trying New Foods: Post	210	3.409524	1.159073	1	5
Liking Fruit: Pre	352	4.40625	0.8849908	1	5
Liking Fruit: Post	208	4.427885	0.8481815	1	5
Frequency of Fruit Consumption: Pre	352	3.079545	0.8959751	1	4
Frequency of Fruit Consumption: Post	208	3.158654	0.8562485	1	4
Liking Vegetables: Pre	352	3.559659	1.060488	1	5
Liking Vegetables: Post	208	3.5	1.150509	1	5
Frequency of Vegetable Consumption: Pre	351	3.019943	0.8893985	1	4
Frequency of Vegetable Consumption: Post	208	2.971154	0.9057703	1	4
Perception of How Good for You Fruits & Vegetables Are : Pre	311	4.456592	0.821415	1	5
Perception of How Good for You Fruits & Vegetables Are: Post	172	4.511628	0.8341285	1	5
Perception of Parent's Happiness with Fruits & Vegetable Consumption: Pre	305	3.606557	1.680761	1	5
Perception of Parent's Happiness with Fruits & Vegetable Consumption: Post	169	3.970414	1.477716	1	5
Perception of Importance of Fruits & Vegetable Consumption to Friends: Pre	218	1.853211	0.3547099	1	2
Perception of Importance of Fruits & Vegetable Consumption to Friends: Post	115	1.878261	0.3284153	1	2
Liking Beans: Pre	350	3.12	1.419229	1	5
Liking Beans: Post	206	3.038835	1.451138	1	5
Frequency of CSF Consumption: Pre	348	1.534483	0.7332888	1	3
Frequency of CSF Consumption: Post	202	1.549505	0.7397894	1	3
Liking CSF: Pre	189	3.15873	1.244644	1	5
Liking CSF: Post	110	3.172727	1.360377	1	5
Friends Liking CSF: Pre	299	3.324415	0.892797	1	5
Friends Liking CSF: Post	169	3.508876	0.9581626	1	5
Perception of How Good for You CSF Is: Pre	177	3.627119	1.141644	1	5
Perception of How Good for You CSF Is: Post	106	3.650943	1.171425	1	5
Liking Rajma: Pre	120	2.958333	1.497313	1	5
Liking Rajma: Post	90	3.355556	1.508859	1	5
Frequency of At-Home Consumption of Entrées like Rajma: Pre	345	1.634783	0.669047	1	4
Frequency of At-Home Consumption of Entrées like Rajma: Post	203	1.615764	0.6822704	1	4
Liking WABG Pre	153	2.803922	1.338001	1	5
Liking WABG: Post	84	2.809524	1	1	5
Frequency of At-Home Consumption of Entrées like Rajma: Post	343	1.603499	1	1	4
Frequency of At-Home Consumption of Entrées like Rajma: Post	201	1.557214	1	1	4
Noticed Posters & Signs	195	2.061538	3	1	3
Remembered Announcements	196	2.030612	3	1	3
Believed Posters & Signs Increased Willingness to Try CSF	111	1.648649	1	1	3
Believed Announcements Increased Willingness to Try CSF	117	1.683761	1	1	3
Believed Rajma Samples Increased Willingness to Eat Rajma	69	3.333333	2	2	4
Believed WABG Samples Increased Willingness to Eat WABG	70	3.171429	2	2	4
Never Tried CSF: Pre	348	0.4568966	0.4988559	0	1
Never Tried CSF: Post	201	0.4527363	0.499004	0	1
Never Tried Rajma: Pre	343	0.6501458	0.4776205	0	1
Never Tried Rajma: Post	203	0.5566502	0.4980085	0	1
Never Tried WABG: Pre	345	0.5565217	0.4975166	0	1
Never Tried WABG: Post	201	0.5820896	0.4944468	0	1
Friends Never Tried CSF: Pre	343	0.1282799	0.3348897	0	1
Friends Never Tried CSF: Post	197	0.142132	0.3500751	0	1
Never Sampled Rajma	195	0.6461538	0.479393	0	1
Never Sampled WABG	195	0.6410256	0.4809344	0	1

* Means are provided for summary purposes. These variables were treated as ordinal rather than continuous in statistical and econometric analyses.

Table 22. Survey Summary Statistics: Pre-post Changes and Post-only Outcomes by Treatment Group

Variable	Group	Mean	Std. Dev.	Freq.
Increased Liking of Beans	0	1.0240964	0.34837265	83
	1	0.97674419	0.3750057	86
	Total	1	0.36187343	169
Increased Frequency of CSF Consumption	0	1.0609756	0.39589127	82
	1	1.0705882	0.48275586	85
	Total	1.0658683	0.44094265	167
Increased Liking of CSF	0	0.95652174	0.47465402	23
	1	1.025	0.61965665	40
	Total	1	0.56796183	63
Improved Perception of Friends Liking CSF	0	1.1355932	0.47188642	59
	1	1.2285714	0.54297699	70
	Total	1.1860465	0.51185084	129
Improved Perception of How Good for You CSF Is	0	1	0.41702883	24
	1	1.0909091	0.38435306	33
	Total	1.0526316	0.39735971	57
Increased Liking of Rajma	0	1	0.51639778	16
	1	1.047619	0.38421224	21
	Total	1.027027	0.44010646	37
Increased Frequency of At-Home Consumption of Entrées Like Rajma	0	0.91566265	0.44734499	83
	1	1.0235294	0.5768649	85
	Total	0.9702381	0.5182374	168
Increased Liking of WABG	0	1.05	0.51041779	20
	1	1.1666667	0.5646597	24
	Total	1.1136364	0.53769141	44
Increased Frequency of At-Home Consumption of Entrées Like WABG	0	0.92771084	0.46284203	83
	1	0.98795181	0.55202456	83
	Total	0.95783133	0.50874069	166
Increased Knowledge of Rajma	0	1.1445783	0.38674786	83
	1	1.5595238	0.52299394	84
	Total	1.3532934	0.50393445	167
Increased Knowledge of WABG	0	0.90361446	0.53224004	83
	1	1.3536585	0.61607983	82
	Total	1.1272727	0.61647737	165
Increased Knowledge of CSF	0	1	0.52115731	82
	1	1.4642857	0.6100845	84
	Total	1.2349398	0.61218609	166
Increased Liking of Trying New Foods	0	1	0.35355339	81
	1	1.0113636	0.51404008	88
	Total	1.0059172	0.44316289	169
Noticed Posters & Signs	0	1.2978723	0.58345997	94
	1	2.7722772	0.58105401	101
	Total	2.0615385	0.93956981	195
Remembered Announcements	0	1.3297872	0.6457187	94
	1	2.6764706	0.61598773	102
	Total	2.0306122	0.92213889	196
Belief that Posters & Signs Increased Willingness to Try CSF	0	1.3823529	0.55129082	34
	1	1.7662338	0.75908712	77
	Total	1.6486486	0.7217233	111
Believed Announcements Increased Willingness to Try CSF	0	1.4878049	0.63725784	41
	1	1.7894737	0.73603966	76
	Total	1.6837607	0.71498219	117
Believed Rajma Samples Increased Willingness to Eat WABG	0	2.8333333	0.78590525	18
	1	3.5098039	0.7582229	51
	Total	3.3333333	0.81649658	69

Believed WABG Samples Increased Willingness to Eat WABG	0	2.9	0.85224163	20
	1	3.28	0.80913156	50
	Total	3.1714286	0.83356105	70
Never Tried CSF: Pre	0	0.50314465	0.50156986	159
	1	0.41798942	0.49453845	189
	Total	0.45689655	0.49885589	348
Never Tried CSF: Post	0	0.59793814	0.49286141	97
	1	0.31730769	0.46768222	104
	Total	0.45273632	0.49900398	201
Never Tried Rajma: Pre	0	0.69620253	0.46135857	158
	1	0.61081081	0.48888948	185
	Total	0.65014577	0.47762048	343
Never Tried Rajma: Post	0	0.70408163	0.4588013	98
	1	0.41904762	0.49576965	105
	Total	0.55665025	0.49800852	203
Never Tried WABG: Pre	0	0.57861635	0.49534092	159
	1	0.53763441	0.49992734	186
	Total	0.55652174	0.49751658	345
Never Tried WABG: Post	0	0.66326531	0.47502312	98
	1	0.50485437	0.50242132	103
	Total	0.58208955	0.49444677	201
Friends Never Tried CSF: Pre	0	0.13291139	0.34055837	158
	1	0.12432432	0.33084658	185
	Total	0.12827988	0.33488972	343
Friends Never Tried CSF: Post	0	0.21649485	0.41399487	97
	1	0.07	0.2564324	100
	Total	0.14213198	0.3500751	197
Never Sampled Rajma	0	0.80851064	0.39558303	94
	1	0.4950495	0.50246915	101
	Total	0.64615385	0.47939295	195
Never Sampled WABG	0	0.78723404	0.41145795	94
	1	0.5049505	0.50246915	101
	Total	0.64102564	0.48093442	195

* Group: 0 = Control Group; 1 = Treatment Group.

* Means are provided for summary purposes. Analyses with these variables treated them as ordinal not continuous.

APPENDIX B

Cornell University
Office of
Research Integrity and Assurance

East Hill Office Building, Suite 320
395 Pine Tree Road
Ithaca, NY 14850
p. 607-254-5162
f. 607-255-0758
www.irb.cornell.edu

Institutional Review Board for Human Participants

TRIENNIAL PROTOCOL APPROVAL- NO FEDERAL FUNDS

To:	Anjali Narang
From:	Carol Devine, IRB Chairperson
Protocol ID#:	1709007464
Protocol Title:	Using Behavioral Economics to Promote Healthy, Plant-based Options at School Lunch
Approval Date:	October 17, 2017
Expiration Date:	October 16, 2020

Cornell University's Institutional Review Board for Human Participants (IRB) has reviewed and approved the inclusion of human participants in the research activities described in the protocol referenced above.

Special Conditions for Triennial Approval of this Protocol: This protocol was granted approval for three years until **October 16, 2020** as it does not involve federal funding and is therefore eligible for Triennial review under the IRB policy #21 (www.irb.cornell.edu/policy). As Principal Investigator for this project, you are responsible for informing the IRB and seeking re-review if at any point during the course of this project, Federal funds may be used to support any part of it. Failure to seek timely review and approval could result in an inability to use research data for the purposes of the Federal grant. Please refer to IRB policy #21 (www.irb.cornell.edu/policy) for more information.

The following personnel are approved to perform research activities on this protocol:

- Anjali Narang
- David Just
- Ceren Karacasu
- Cindy Huang
- Giovanni Sogari
- Hehuanyu Li
- Michelle Wu
- Nan Meng
- Ngodoo Zume
- Nicholas Hansen
- Rebecca Cardinali

- Reeya Khurana
- Shuo Yu
- Tra Nguyen
- Xi Chen
- Yin Yu
- Zekun Ma

This approval by the IRB means that human participants can be included in this research. However, there may be additional university and local policies that apply before research activities can begin under this protocol. It is the investigator's responsibility to ensure these requirements are also met.

Please note the following important conditions of approval for this study:

1. All consent forms, records of study participation, and other consent materials **must** be held by the investigator for **five years** after the close of the study.
2. Investigators must submit to the IRB any **proposed amendment** to the study protocol, consent forms, interviews, recruiting strategies, and other materials. Investigators may not use these materials with human participants until receipt of written IRB approval for the amendment. For information about study amendment procedures and access to the Amendments application form, please refer to the IRB website: http://www.irb.cornell.edu/forms.
3. Investigators must promptly report to the IRB any **unexpected events** involving human participants. The definition of prompt reporting depends upon the seriousness of the unexpected event. For guidance on recognizing, defining, and reporting unexpected events to the IRB, please refer to the IRB website: http://www.irb.cornell.edu/policy.

If the use of human participants is to continue beyond the assigned approval period, the protocol must be re-reviewed and receive continuing approval. As the Principal Investigator it is your responsibility to obtain review and continued approval before the expiration date. Applications for renewal of approval must be submitted sufficiently in advance of the expiration date to permit the IRB to conduct its review before the current approval expires. Please allow three weeks for the review.

Any research-related activities -- including recruitment and/or consent of participants, research-related interventions, data collection, and analysis of identifiable data -- conducted during a period of lapsed approval is unapproved research and can never be reported or published as research data. If research-related activities occur during a lapse in the protocol approval, the activities become a research compliance issue and must be reported to the IRB via an unexpected event form (www.irb.cornell.edu/forms).

****If you do not plan to renew your protocol approval in three years, please provide the IRB with a Project Closure form. A link to the Project Closure form can be found at http://www.irb.cornell.edu/forms/.**

For questions related to this application or for IRB review procedures, please contact the IRB office at irbhp@cornell.edu or 255-6182. Visit the IRB website at www.irb.cornell.edu for policies, procedures, FAQs, forms, and other helpful information about Cornell's Human Participant Research Program. Please download the latest forms from the IRB website www.irb.cornell.edu/forms/ for each submission.

Cc: David Just

康奈尔大学
儿童参与研究的父母许可函

********如果您拒绝提供许可，请您在【*DATE*】前仔细阅读并完成以下表格，以使您的孩子不参与此次调查********

研究名称：采用行为经济学方法促进健康，以绿色食蔬为基础的学校午餐选择研究

主要调查员：Anjali Narang

IRB研究编号：1709007464

我的名字是Anjali Narang，是康奈尔大学在读研究生，专业为应用经济学与管理。我们需要您的孩子参与到一项调查研究中，这项研究是我与健康学校食品联盟合作进行的，研究内容是学生在学校午餐时的饮食习惯。健康学校食品联盟通过其酷派食品计划，引入了国际化的以绿色食蔬为基础的学校午餐菜单。

请阅读以下信息和本文末尾的说明。

为什么要进行这项研究？
此项研究的目的是利用基于行为经济学的低成本、易于实施的干预措施，“促使”孩子在学校午餐时选择和消费更多健康的以绿色食蔬为基础的食品，并对此方法进行评估。该研究将专门针对酷派食品计划的主菜和蔬菜水果。

我的孩子在此次研究中会被要求做什么？
我们需要您的孩子在课堂中完成同一份调查两次，一次在研究开始之前，一次在研究结束后，以辨别他或她的回答是否有所改变。您的孩子将需要填写他/她自己的基本信息，他/她对水果蔬菜和酷派食品主菜及其组成部分的看法，以及他们与这些食物相关的饮食行为。我们还会询问您的孩子，了解他们对于研究中的干预措施的认知情况和意见。每次调查将花费您的孩子大约15分钟的课堂时间。

对我的孩子有什么可能的风险或不适？
这项研究不会对您的孩子造成任何超出正常日常生活的身体或精神上的风险。

这对我的孩子或其他人有哪些可能的益处？
虽然您的孩子参与到这项调查中并不能带来直接的益处，但可能会有间接的益处。我们相信这项调查将有助于我们了解儿童的饮食习惯和偏好，以及我们可以采取怎样的措施以利用这些习惯和偏好，使孩子们不仅要吃得更健康，而且愿意吃得更加健康。

你们如何保护收集到的关于我们孩子的信息，以及如何分享这些信息？
我们通过不收集身份信息（如您孩子的姓名）来尽量减少对您孩子隐私泄露的风险。您的孩子将被分配ID号码，而姓名与ID号码的匹配将仅由教师保管，与研究数据分离。调查数据将仅以ID号码作为身份标识。

本研究的结果可能被用于出版和展示。这项研究的数据很可能与研究界共享，以推动科学和健康发展，但如前所述，这些数据将不包括可识别身份的信息。

财务信息
参与这项研究将不会对您或您的孩子造成任何费用。您的孩子参加这项研究不会获得财务补助。

我的孩子作为研究参与者的权利是什么？
此次研究基于自愿原则，因此您的孩子可以随时选择不参与调查或停止调查。您的孩子也可以随意跳过他/她不想回答的任何问题。如果您的孩子决定退出本研究，我们将不会使用已收集到的信息。

您和您的孩子不会因停止参与此次研究而受到任何惩罚，也不会失去任何好处。如果您和您的孩子决定不参加这项调查，这不会对您和您的孩子与学校的关系产生任何影响。您孩子的成绩不会受到影响。

后续研究
我们可能会再次与您联系，邀请您参加后续研究。您的参与将是自愿的，并且在任何形式的后续研究进行前，我们将明确征求您的同意。

如果对本研究有疑问或疑虑，我可以联系谁？
如果您或您的小孩有任何问题，您可以联系主要研究员Anjali Narang，电子邮件为aun2@cornell.edu，电话是（973）943-6699。请询问您现有的任何问题。

如果您对您孩子作为本研究参与者的权利有任何疑问，可以通过（607）255-6182联系机构审查委员会（IRB）的人类参与者部门，或访问他们的网站http://www.irb.cornell.edu。您还可以通过Ethicspoint在线或www.hotline.cornell.edu匿名报告您的疑虑或投诉，或拨打免费电话1-866-293-3077。Ethicspoint是一个独立的组织，作为大学与投诉人之间的联络人以保证匿名性。

家长们请注意，根据“学生权利保护法”(20 U.S.C. Section 1232(c)(1)(A))，您有权查阅此次学生参与的调查的副本。如果您想这样做，请您联系Anjali Narang获取调查副本。

子女参与课题调研的父母许可

您的子女将参与课题前期和后期的两份调查问卷，如若退出需填写以下文件。也可联系课题负责人 Anjali Narang， aun2@cornell.edu or (973) 943-6699 申请退出参与此课题。

如果您不同意子女参与调查问卷，请选择以下两项中任意一项：

(1) 通过链接 https://goo.gl/forms/p9mXcpIBw2TdzVcI3完成表格阐明您不同意子女参与此项目。 或
(2) 填写以下表格并打印将纸质版由子女交给校方，或通过邮寄，或个人亲自递交给学校。

如果您同意子女参与此课题，您不需要填写以下表格。没有填写以下表格将自动视为同意

- 您已了解课题并阅读此文件。
- 如有疑问，您已提出并获得解释。
- 如果您仍有其他疑问，您已获知相关人员联系方式。

请记住不要告诉您的子女课题内容除非有关学校午餐，如果他们知道自己的饮食习惯被记录研究可能会改变行为。

感谢您的参与和时间！

关于子女参与课题研究的父母许可拒绝书

课题：通过行为经济学促进健康，以绿色食蔬为基础的学校午餐工程

请记住填写以下表格表明您**不同意**子女参与此课题。若**同意**，您将不必填写以下表格表示默许。

* 必填

1. 子/女名 * _____
2. 子/女姓 * _____
3. 年级 *
   - O 三年级
   - O 四年级
   - O 五年级
4. 您的 (父母) 姓名 * _____
5. 学校 *
   - O [C1]
   - O [T1]
   - O [T2]
   - O [C2]
6. 电子邮箱 * _____
7. 电话 * _____

我已阅读 “关于子女参与课题的父母许可.” 我不同意子女参与此课题调查研究。

签名 * _____

打印名 * _____

日期 * _____

CORNELL UNIVERSITY
PARENTAL PERMISSION FOR CHILD'S RESEARCH PARTICIPATION

********PLEASE READ AND COMPLETE THE FORM TO HAVE YOUR CHILD OPT-OUT OF THE SURVEY BY [DATE] IF YOU WOULD LIKE TO DECLINE TO PROVIDE YOUR CONSENT********

Study Title: Using Behavioral Economics to Promote Healthy, Plant-based Options at School Lunch

Principal Investigator: Anjali Narang

IRB Study Number: [XXX]

My name is Anjali Narang, and I am a graduate student at Cornell University studying Applied Economics & Management. Your child is being asked to take a survey as part of a research study I am conducting in partnership with the Coalition for Healthy School Food on eating habits at school lunch. The Coalition for Healthy School Food, through its Cool School Food program, introduces international, plant-based entrees on school menus.

Please read the information below and the instructions at the end of this document.

Why is this study being conducted?
The purpose of the study is to use and evaluate low-cost, easily implementable interventions based on behavioral economics to "nudge" kids to choose and consume more of the healthy, plant-based options at school lunch. The study will specifically target Cool School Food entrees and fruit and vegetables.

What will my child be asked to do if my child is in this study?
Your child will be asked to complete a survey twice, once before the study starts and once after the study ends, in class, in order to discern whether his or her responses have changed. Your child will be asked basic information about him- or herself, his or her opinions of fruits and vegetables, Cool School Food entrees and their components, and his or her eating behavior as it relates to these items. Your child will also be asked about his or her knowledge and opinions of the interventions that will take place during the study. The survey should take about 15 minutes of your child's classroom time each time it is administered.

What are the possible risks or discomforts to my child?
Your child's participation in this study does not involve any physical or emotional risk to your child beyond that of everyday life.

What are the possible benefits for my child or others?
While there are no direct benefits to your child from taking this survey, there might be indirect benefits. We believe this survey will help us learn about children's eating habits and preferences, as well as which kinds of efforts can help tailor these habits and preferences such that children not only eat healthier, but also will want to eat healthier.

How will you protect the information you collect about my child, and how will that information be shared?

We are minimizing the risk of breaches of confidentiality of the information we collect from your child by not collecting identifying information such as your child's name on the surveys. Your child will be assigned ID numbers and the information matching names to ID numbers will be kept only by teachers, separate from the research data. The survey data will only use ID numbers as identifiers.

Results of this study may be used in publications and presentations. Data from this study may be shared with the research community at large to advance science and health, but as stated previously, this data will not include identifiable information.

Financial Information

Participation in this study will involve no cost to you or your child. Your child will not be paid for participating in this study.

What are my child's rights as a research participant?

Your child's participation in the study is voluntary, and thus he or she can choose not to take the survey or stop the survey at any time. Your child is also free to skip any questions he or she does not want to answer. If your child decides to withdraw from this study, the information already collected will not be used.

You and your child will not be penalized in any way or lose any sort of benefits for stopping participation. If you and your child decide not to be in this study, this will not affect the relationship you and your child have with your child's school in any way. Your child's grades will not be affected.

Follow up studies

We may contact you again to request your participation in a follow up study. As always, your participation will be voluntary and we will ask for your explicit consent to participate in any of the follow up studies.

Who can I contact if I have questions or concerns about this research study?

If you or your child have any questions, you may contact the main researcher, Anjali Narang at aun2@cornell.edu or (973) 943-6699. Please ask any questions you have now.

If you have any questions about your child's rights as a participant in this research, you can contact the Institutional Review Board (IRB) for Human Participants at (607) 255-6182 or access their website at http://www.irb.cornell.edu. You may also report your concerns or complaints anonymously through Ethicspoint online at www.hotline.cornell.edu or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

Parents, please be aware that under the Protection of Pupils Rights Act (20 U.S.C. Section 1232(c)(1)(A)), you have the right to review a copy of the survey that will be used with students. If you would like to do so, you should contact Anjali Narang to obtain a copy of the survey.

Parental Permission for Child's Participation in Research

Your child will take both the pre- AND the post-survey unless you fill out the following form to opt-out. You may also contact the main researcher, Anjali Narang, to opt-out at aun2@cornell.edu or (973) 943-6699.

If you do NOT agree to provide consent to your child taking the pre- OR the post-survey, please either

(1) fill out the following Google form indicating that you do NOT provide consent. The full URL for the form is: https://goo.gl/forms/p9mXcpIBw2TdzVcI3, OR
(2) fill out the hard copy version of the form provided with this document and have your child hand it in for you to the school, mail it back to the school, or personally deliver it to the school.

If you consent to your child participating in this study, you do NOT have to fill out the form. Your consent is implied by the fact that you are not filling out form provided. Your consent indicates that

- You have read this form and the research study has been explained to you.
- You have been given the opportunity to ask questions and your questions have been answered.
- If you have additional questions, you have been told whom to contact.

Please remember not to let your children know any details about the study except that it is about school lunch. If they were to know that their eating habits are being studied, they may alter their behavior.

Thank you for your time!

Cornell Institutional Review Board
Approved: 10/17/2017
Expires: 10/16/2020

OPT-OUT PARENTAL PERMISSION FORM FOR CHILD'S RESEARCH PARTICIPATION

Study: Using Behavioral Economics to Promote Healthy, Plant-based Options at School Lunch

Please remember that you only have to fill out this form to indicate that you do NOT agree to let your child take the survey as part of this study. If you DO agree, your consent is implied by the fact that you do not fill out this form.

* Required

1. Child's First Name * _____
2. Child's Last Name *
   _____
3. Grade *
   - O 3rd grade
   - O 4th grade
   - O 5th grade
4. Your (Parent's) Name * _____
5. School *
   - O [C1]
   - O [T1]
   - O [T2]
   - O [C2]
6. Email address *
   _____
7. Phone Number *
   _____

I have read "PARENTAL PERMISSION FOR CHILD'S RESEARCH PARTICIPATION." I do not agree to give my consent to let my child take the survey as part of this study.

Signature * _____

Printed Name * _____

Date * _____

Cornell Institutional Review Board
Approved: 10/17/2017
Expires: 10/16/2020

[CHILD ASSENT FORM]

[The form will be provided with the pre- and post-survey. Only a copy of the post-survey is provided in this application, because the pre-survey is identical to the post-survey except for the fact that it excludes the last section, Section 4.]

We are doing a study to learn about children's eating habits and opinions of school lunch. We think you can help.

If you agree to be in our study, we are going to ask you some questions about what you eat and what you think about certain foods.

You can ask the teacher questions about this study at any time. If you decide at any time not to finish, you can ask the teacher to stop.

There are no right or wrong answers because this is not a test and this will not affect your grades. The answers you give will be kept private. No one will ever know what you say unless you tell them. Your name will never be used.

Continuing with this survey means that you have read this and that you want to be in the study. If you don't want to be in the study, please let the teacher know. Being in the study is up to you, and no one will be upset if you don't want to be in it or if you change your mind later.

APPENDIX C

DATA COLLECTION CHECKLIST

Date:

School:

Name:

Each researcher is responsible for completing relevant parts of this checklist. Prioritize bold items if time is limited.

I. PRE-SITE VISIT PREPARATIONS

Lead researcher for each school: Gather the materials one day before each observation date and put in a location such that you will remember to take the materials with you to the schools.

☐ **ALL SHEETS ARE DOUBLE-SIDED! Numbers are on a per school basis.**

- ☐ This checklist (x18)
- ☐ Taste-testing checklist (x6)
- ☐ Clipboard (x4-5)
- ☐ Pens, pencils with erasers (x10)
- ☐ Sample data sheet (x1)
- ☐ "GENERAL DATA SHEET"s (x9)
- ☐ "SELECTION DATA SHEET"s (x30)
- ☐ "WASTE DATA SHEET"s (x30)
- ☐ Table tent materials: cardstock paper (x10) and sharpies
- ☐ Lunch period schedule (x7)
- ☐ Serving Guide: Training powerpoint slides + "How much is a cup of fruits and vegetables" (x3 each)
- ☐ Food coloring markers for labeling
- ☐ Scale + extra batteries
- ☐ Blue folders for each person to put in completed sheets, etc
- ☐ Three folders with data sheets
- ☐ Closed toe shoes
- ☐ Wear your hair back if you have long hair
- ☐ Dress appropriately – do not underdress or overdress. Try to wear neutral colors and outfits that don't draw attention to you.

- ☐ *Remember if you lost the paper copies of the data sheets, you can print them out from the Google Drive folder. The Excel versions of these sheets will also be in this folder. If you use a printer on-campus, get a receipt of the printing cost for reimbursement purposes.*

II. ARRIVAL AND SET-UP

☐ **Arrive to the school at least 30 minutes before the first lunch period.**

Park in visitor parking and enter through the front door.

- [T1] – park in the lot on the side NOT in front.
- [C1] – can park on street or in the parking lot on the side.
- [C2] – park in lot BEHIND the school – have to go around. [T2] – park in the lot in the back?

☐ Sign in at the front office and obtain a visitor's pass.

If you do not know where the find the cafeteria, ask for directions at the main office.

☐ **Introduce yourself to a cafeteria kitchen staff person on duty, and let him/her know you are there to collect data for the Cool School Food lunch study.** The cafeteria manager should be expecting you.

☐ *****Make sure labeled trays are used by cafeteria staff! Note the first tray number on the stack on the General Data Sheet.**

Confirm duties of each member of the research team.

☐ *****In the case where there are only three data collectors, one member of the waste team should help out the selection person, and then after the lunch line ends, can go back to the waste table. Being speedy recording the selection data is of utmost importance, so we don't cause a hold-up!*****

Default sampling procedure: code all trays with Cool School Food (CSF) entrees + as many trays as possible.

- In the case where you have a table and don't have enough time to code all the trays: plan to only collect every other tray. If more modifications need to be made, plan to randomize trays by collecting every 3rd, 4th, or other number tray.
    - Duties should be pre-determined, prior to your visit if possible.
    - One researcher is recording selection on the "SELECTION DATA SHEET".
    - Two other researchers are recording waste ("waste team"). One of those two is the "**caller**," the other is the "**recorder**." The **caller** calls out the tray number, grade, item and number of quarter servings wasted to the **recorder**, who records it on the "WASTE DATA SHEET".
    - If there is a fourth person for data collection **("director"),** that person will fill out the general data sheet and help direct kids to the selection researcher and waste team.

Responsibilities of Lead:

1. **Bringing the box** to the schools and making sure you have the materials you need
2. **Ensuring that the General Data Sheet is completed**
3. **Completing the Data Collection Checklist**
4. Knowing what is going on - **read the Data Collection Checklist beforehand**, look at the Training PPT if you need to
5. Ensuring that others know what they need to do, assigning roles if you need to, etc.
6. Communicating with me if you have a question or something goes wrong

7. Making sure you get to the schools on time and facilitating the coordinating of rides

Confirm which the menu items are being offered with the food service staff and pre-fill out the food items column in the data sheets.

- **Please do not prefill your data sheets with the tray numbers!**
- **Please try to get grade, race, and gender when collecting data!** *Having more complete data on one tray is better than having more trays with incomplete data.*

It is important to record data consistently within and across schools! Everybody should have exactly the same items on all the data sheets. Your team should write down the list of food items together on your respective data sheets, and use check marks to indicate selection of a food item, and the quarter waste method to indicate waste. I would suggest one person prefills the sheet first, and everybody else copies.

******Please use the items in the text box on page 2 of the General Data Sheet as they are written to prefill in the "Food Items" on your Data Sheets! These 16 items, plus or minus a few items, should be on your data sheets every Thursday!***

☐ **Complete section 2 of "GENERAL DATA SHEET", listing and describing any new or different menu items in the blanks or appropriate cells.**

☐ **The researcher doing selection should mark all items offered that day on the "SELECTION DATA SHEET."**

☐ **Recorder should mark all items offered on the "WASTE DATA SHEET".**

Walk through serving area and collectively note clues that will help you identify food items on the trays at the waste station.

☐
- food clues: crumbs, cores, shine
- serving clues: plate, wrappers, utensils, condiment packet
- plated meals: typically TWO meals

*****Lead researcher fills out remaining parts of Sections I, IV-V of "GENERAL DATA SHEET.** Section VI is filled out during lunch. Sections II, III. VII, and VIII can be filled out after lunch if short on time.

☐
- **Please remember to fill out Section V of the General Data Sheet, "Observing the Cafeteria Environment" because posters and signs are part of the interventions** -- I will need to know which and where the posters/signs were during the baseline period!

☐ **Review cafeteria layout and plan each person's positions. Make sure you have everything you need (table, gloves, etc).** Make sure to ask cafeteria staff if this setup is acceptable before moving anything.

☐ NE: We will not have a table. People who bring lunch from home should throw out the trash in one set of cans. The other set to throw out waste from school lunch.
- We will have two recorders instead of a caller and a recorder - **both members of the waste team should**

stand next to the garbage bin and code all trays with CSF entrees + as many trays as possible.

[C2], [C1], and [T1]: We will have a table to collect the trays. There should be at least one table and one chair.

- **Place tables used for tray collection in front of and in between the trashcans.**
  - You want to make sure that the students have to interact with you such that you don't miss them on their way to throwing out their garbage.
  - You will want to move all trash cans in arm's reach of the table if possible so you don't have to reach to throw out the trays. The trash can should be closer to the caller rather than the recorder, because the caller will be the one throwing out the trays.
- The **recorder** will sit in the chair and record.
  The **caller** will call out the information and dispose of the trays after his/her calls are recorded.
- You want to have room for 2-3 trays at the very least on the tray collection table. If the space is too small, you might have to start stacking.
- IF ONLY ONE RECORDER: Try to set a space for a loading area for the trays you can't get to, so the recorder doesn't feel rushed when there is a lot of traffic, and then he/she can work on them when there is a lull.

Record initial serving sizes for all food items prior to the lunch period – this should be done every single time. One serving of fruits/vegetables is supposed to be ½ cup, but this may not be the case at your school.

- Packaged foods: on wrapper/container
- Entrée: weigh
- Whole fruit: weigh
- If self-serve (not pre-portioned): use portion size guidelines provided in a separate document to weigh a visual estimate of a half cup
- Pre-portioned salad, vegetables, or fruit: weigh portion as it is served.

How to Use Scale

1. Press the on button on the scale.
2. Weigh tare[1], and press button again to calibrate tare weight to 0.
3. Weigh tare + food item in grams. Do this three times for three different portions and average.
4. Write down average weight in g in General Data Sheet, Section IV, Column 2.
5. **TAKE PHOTO of Portion Sizes: All tray waste data collectors should familiarize themselves with what one portion of food looks like in order to know what less or more of a serving looks like. This can be done can while taking the pre-weight.**

You can use the cardstock to make table tents for your table like "Please stop here."

[1] Tare: the empty tray, plate, and/or bowl or other packaging (if there is any) that the food will be weighed in.

☐ Ask food service staff for gloves for when you dispose of waste.

☐ IF THERE IS TIME, take notes on anything that is different or unusual from what the cafeteria is normally like and write down these notes in the "Other Notes" section of the General Data Sheet. Your idea of "normal" should be based on the visit to the cafeteria before the study officially began. **Take photos of the following:**

- ☐ **Cafeteria setup as a whole**
- ☐ **Close up of each item offered**
- ☐ **Lunch line set up as a whole, including sides and beverages**

Label the trays for next time either before or after lunch.

- Start off from the last tray you did last time (e.g. first observation date – 1-240; second observation date: 240-480, third observation date: 481-720, etc. The trial run counts as the first observation date)

☐

- Make sure you label them with food coloring markers, where the milk carton is, unless you are at [C2], in which case you should write on the number on each of the two long sides of the tray, on the outside, or all on four sides.
- Label 240 trays if you can. 300 might be safer at [T2]. Otherwise, 120 at [C1] and 200 at [C2] and [T1] should be good enough.

III. DATA COLLECTION

Note: There are multiple lunch periods in each school. The busiest time for the casher is at the start of each lunch period. The busiest time for the caller and recorder is 10 minutes before the end of each lunch period.

☐ *** Curious students may ask about your purpose. Answer questions succinctly without indicating that the trays are being studied. For example, "I am trying to learn more about school lunch [your cafeteria]" is a good response.** You don't want to let them know you are studying their eating habits, as this might affect their behavior. **Try to gently remind the adults who might be helping you direct the students not to tell the children that we are studying their food choices or waste.**

CAFETERIA ETIQUETTE:
During observations, make sure to:

- Place your clipboard close to your body so the data sheets is kept out of view of staff/students passing by.
- Stand near the students where there is a good view but where you are out of traffic.
- Keep a straight neutral face (not smiling, but not mean-looking either)

☐

- If a student says hi or smiles at you, the best way to stop further interaction is to keep a neutral face, not smile back, give a slight nod of acknowledgement, and look away or walk away.
- If a student continues to probe or ask questions, reply with the following: *"Sorry, but I am busy right now. I can answer your questions later."*
- If a student asks for help, reply with the following: *"Sorry, but I am busy right now. You can ask a friend or a lunch aid for help."*

- If a lunch aid asks for help, reply with the following:
  "Sorry, but I am busy with a task right now. Perhaps you can ask a teacher or another school lunch aid for help.
- When being probed by a student, walking away from the student after giving them a short answer would help in breaking continued probing.
- *Distress:* If a student notices that they are being observed and requests for you to stop observing him/her, you should stop observation immediately and leave the area. Should there be any distress due to our presence even when we are not conducting observations, stop all observations immediately and leave the cafeteria vicinity. If distress continues, or if distress is occurring not due to our presence, school staff on site will be capable and fully equipped to handle the situation and provide referrals as appropriate. If you are the only adult around that can best respond to a distress, especially in the case of an emergency involving student safety, step in and help if you are able to.

Remember:

- Do not impose on students or school - schools are doing us a huge favor accommodating us
- Establish and maintain positive rapport and be friendly
- Be respectful of school food staff and school food

*****IDENTIFY THE LUNCHROOM MONITORS and ask them to help instruct students to go to the researchers at the end of the lunch line before sitting down and to give their trays to the researchers by the garbage cans instead of throwing the trays out themselves. The researchers will also have to ensure this by catching students' attention as they pass by.**

☐ **You can ask the lunchroom monitors to give the following announcement to the cafeteria:**
"Researchers from Cornell University are here today doing a study on school lunch. If you got school lunch, please go the garbage cans by the stage and stop by the researchers before throwing out your trash. If you brought lunch from home, please go to the garbage cans on the other side."

When lunch service begins, researchers should position themselves.

☐
- Selection researcher should position him/herself at the end of the lunch line, near the cash register, for example, to be able to catch the kids before they sit down.
- The "caller" and "recorder" should position themselves at the plate waste data collection station *in front* of the bins.

☐ **Selection person fills out Section VI of "GENERAL DATA SHEET"** to record when the different grades are coming in throughout lunch. *****He/she can ask the cafeteria manager as to what grade a certain line is coming in.**

SELECTION

- Selection researcher asks students at the end of the lunch line to stop in order to record their selections.

☐
- **IN THE CASE OF MULTIPLE OR FEWER THAN ONE SERVING(S) SELECTED: If they took more or less than one serving, as defined in the General Data Sheet, note it correspondingly (2 for 2 servings, ½ for ½ a serving, etc.)**

WASTE

- Caller and/or recorder asks students to place trays on the table, or to stop before throwing out their trash if there is no table.
- Caller visually estimates the amount of food students left on the plate.
- **Remember: You are measuring amounts of foods WASTED not consumed!**

Order matters (and call in order)

1. *Tray number*
2. *Grade?*
3. *Entrées*
4. *Fruits*
5. *Vegetable*
6. *A la carte items (bagels, sandwiches, yogurt, egg, etc)*
7. *Milk*
8. *Other beverages*

CODING DIRECTIONS:

- **Each numbered column represents a specific tray. Don't prefill columns with tray numbers. Only enter tray numbers for which you have data.**
- If there is no number on the tray, leave the tray number blank and continue to fill out that column.
- If you can't tell whether an item was on the tray, leave cell blank. Only enter data for food that you can identify.

Enter "0" for none wasted
Enter "1" for ¼ wasted
Enter "2" for ½ wasted
Enter "3" for ¾ wasted
Enter "4" for all wasted

For food items that have been completely consumed, look for *traces and/or clues* of the items that were on the plate. Observing the pre-plated food items prior to service again is essential.

- Food clues: crumbs, core, pit, peel, or grease on the plate.
- Serving item clues: a sandwich wrapper, a salad dressing or condiment packet, a serving cup or bowl, a spoon, straw or other utensil, or a particular tray.

- **If you can't tell the difference between the different sandwiches (cold cut vs. PB&J), just add a row for "sandwich".**
- **If you can't tell the difference between the bagels (cream cheese vs. melted cheese), just add a row for "bagel".**
- If you can tell that something (side/fruit/veg) was chosen, but not what specifically, just add a row and write in a generic name (e.g. "side", "fruit," "veg") in the food item column.

REMEMBER WE ARE NOT CONCERNED WITH MILK/JUICE WASTE. JUST SELECTION.

Use their disposal system!

1. **Garbage can for trash**
2. **can for compost**
3. **bucket for milk/beverage liquids (dump out)**
4. **can for milk/juice cartons**
5. **can for trays**

Make sure that you do NOT throw out the trays, as the trays are compostable and disposed of separately. Do NOT stack them.

There might be some trays that were labeled with address labels -- peel them off the on the trays before disposing of the trays, as they are not compostable! Thanks!

IV. AFTER DATA COLLECTION

- ☐ **Lead researcher: DOUBLE CHECK ALL WORKSHEETS WITH YOUR TEAM AND MAKE SURE THAT THEY ARE COMPLETE with names, dates, school, page numbers, etc. BEFORE CLEANING UP! Fill out the remaining sections of the General Data Sheet if you haven't already, e.g. Sections II, III. VII, and VIII of the General Data Sheet.**
- ☐ **Please take a few minutes at the end to debrief with your team and fill in the "Other Notes" section of the General Data Sheet accordingly.**
- ☐ **Throw away all waste appropriately and clean up. Return materials to Lead Researcher, and take the completed data sheets with you.**
- ☐ **Thank all cafeteria staff!**
- ☐ **Sign out at the office.**
  - ☐ *****Confirm that there was a morning announcement about the study made instructing kids to go to the researchers at the end of the lunch line and the garbage bins.**
  - ☐ *****(Only applicable during intervention period at treatment schools) Confirm that the recipe-specific morning announcements were scheduled over the loud speakers with the school secretary.**
- ☐ **Fill out the SELECTION SPREADSHEET, WASTE SPREADSHEET and place photos or any other digital materials corresponding to each observation date in the Google Drive folder for your school for that date. Deadlines to be discussed.**
  - ☐ The researcher who recorded selection will be responsible for inputting the data he/she collects into the SELECTION Excel spreadsheet.
  - ☐ The researcher who recorded waste will be responsible for inputting the data he/she collects into the WASTE Excel spreadsheet.

THANK YOU!

INTERVENTION CHECKLIST

For [T1] and [T2]

Please fill out for each observation date: November 30, December 7, and December 14. Anjali will collect hard copies at the end.

Short list of interventions:

- Recipe-specific announcements
- Recipe-specific posters and signs
- *Taste-tests, with recipe hand-outs
- Fruits and vegetables served on colorful bowls trays to increase their salience and appeal - only intervention unrelated to CSF specifically

Images of posters and sign on next page.

Checklist

You should probably divide this checklist amongst your team members to be efficient.

BEFORE LUNCH

1. **Recipe-specific announcements.** When you arrive at the main office, check whether the recipe-specific announcement was made the day before (Wednesday) and the day-of (Thursday). The announcements should be for West African Beans & Greens the week of November 30, and Ms. Patel's Rajma for the week of December 7 and December 14.
   - ☐ Announcements were made day before
   - ☐ Announcements were made day of

2. **Taste-testing supplies.** Confirm that you have the following materials:
   - ☐ Small cups to put tastings in, e.g. 3 oz. white paper cups
   - ☐ Wheel cart: to put your trays with samples; if there are multiple shelves, then the tray with the samples would go on the first, another tray with samples could go on the second, supplies could go on the third
   - ☐ Extra food (2 gallons?): enough to prepare the taste tests but also to accommodate an increase in selection
   - ☐ Trays: to put sampling cups
   - ☐ Taste testing spoons: to give out with sampling cups to the kids
   - ☐ Gloves: to prepare and serve food samples
   - ☐ Paper towels and/or napkins: to give out to the kids with their samples?
   - ☐ Garbage can: with liner to dispose of used cups and other trash (may not have). You may have to take the garbage from the kids and dispose of it.
   - ☐ Spoons, etc to prepare samples

3. **Taste-tests preparation.**
   - ☐ Prepare the taste-tests before lunch starts. Prepare only the amount of samples that will fit on the cart and in the warmer.

- ☐ Keep samples in the warmer so the samples don't get cold before the kids try them, as that will make them less appealing.

Note: You have double-sided tape and Velcro to hang up posters and signs. Double-sided tape may not work depending on surface. You only need two Velcro tabs (two back-to-back=one) for the 8.5x11 size poster.

4. **Put up serving line sign (15x3 or smaller version) for that day. See wide sign on last page for a reference.**
   - ☐ At [T1], put it on the glass covering the hot entrees. At [T2], it is behind the steel counter, hanging from the wooden counter. There are two serving line signs in different sizes. Use the bigger one if you can, but the smaller one may fit better, i.e. the bigger sign may be wider than the space that the CSF entrée takes up.

5. **Check up on posters and signs (three sizes for each entrée, see images on last page).** Check to see where the following posters are located. I will let you know where they are after I put them up. Check to see if any of them are falling off and fix them. I'll try to provide you some tape in case you need to fix them. Otherwise, maybe you can ask the main office if they have any tape, etc.

   For 11/30, 12/7, and 12/14
   - ☐ West African Beans & Greens 8.5 x 11 (up to 10 posters): should be on the walls in/around cafeteria.
   - ☐ West African Beans & Greens 15 x 3 (serving line sign) (up to 2 signs): should be on glass at [T1]. At [T2], it should be behind the steel counter where they serve lunch, probably hanging from the wooden counter by the hot trays.
   - ☐ West African Beans & Greens 18 x 24 (1 poster): this will probably be on the walls closer to the main entrance.

   For 12/7 and 12/14
   - ☐ Ms. Patel's Rajma 8.5 x 11 (up to 10 posters): should be on the walls in/around cafeteria.
   - ☐ Ms. Patel's Rajma 15 x 3 (serving line sign) (up to 2 signs): should be on glass at [T1]. At [T2], it should be behind the steel counter where they serve lunch, probably hanging from the wooden counter by the hot trays.
   - ☐ Ms. Patel's Rajma 18 x 24 (1 poster): this will probably be on the walls closer to the main entrance.

6. **Serving fruits and vegetables.**
   - ☐ Confirm that all fruits and vegetables are being served in red or green bowls and/or gold trays. Take photos.
   - ☐ Confirm that these colorful bowls and trays are being used *only on Thursdays*.

7. **Check in with Anjali**.
   - ☐ Text Anjali to confirm as to whether all these things occurred. Or call if something has gone wrong. You may send her a photo of this checklist.

DURING LUNCH

8. **Giving out the taste-tests.** Make sure you ask every kid, and multiple times a kid if necessary.
    - ☐ Take a photo of the samples, etc. But not of the kids.
    - ☐ Use **verbal prompts** to entice students to try a sample. **Tell them how good (tasty, delicious, yummy, etc.) it is and how much other kids liked them**. Change your tactics depending on the grade.
        i. "Who is brave (adventurous) and feels like trying something new?"
        ii. "It's Cool School Food Day. Today's special is…"
        iii. "Try some power food. It helps you build strong muscles." This may only work for younger kids. Older kids might be deterred by this.
    - ☐ Even if they say no to the sample the first time, keep trying. I was given advice to ask each kid 4 times, unless they are really young. Don't make them uncomfortable or upset.
    - ☐ Try to offer samples to a kid in a group of kids (i.e. leverage the power of peer effects).
    - ☐ **Hand out recipe flyers with samples**. Only hand out the recipes for the to the CSF entrée being served that day, i.e. don't hand out the recipes for West African Beans & Greens and Ms. Patel's Rajma at once.
    - ☐ Get feedback after they're done, and make note of it on the General Data Sheet.
    - ☐ You may have to take the garbage from the kids and dispose of it.
    - ☐ If you or somebody on your team has free time, also give out some samples and flyers to the kids who brought lunch from home, and get their feedback.

AFTER LUNCH

9. **Clean up after taste-tests.** Make sure to clean up after the taste-tests and ask the cafeteria manager where you should put remaining supplies.

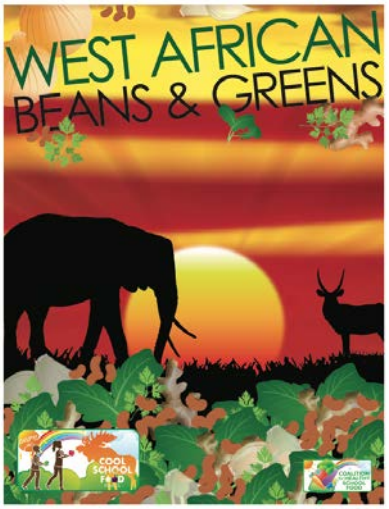
10. (only at [T1], 11/30) **Put up remaining posters for Awesome Bean Burger**. This a CSF entrée offered earlier in the week. FYI, I am not formally including it in my study in the same way as the other two entrees.
    - ☐ Put up five 8.5 x 11 posters in the cafeteria and other places you see fit.

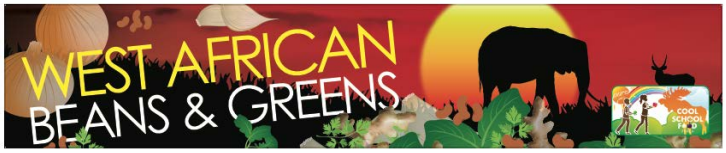
11. **Check up on posters for Awesome Bean Burger**.
    - ☐ **Awesome Bean Burger** 8.5 x 11 (up to 10 posters): should be on the walls in/around cafeteria.
    - ☐ **Awesome Bean Burger** 15 x 3 (serving line sign) (up to 2 signs): just ask the cafeteria manager if they have this, and whether they used it.
    - ☐ **Awesome Bean Burger** 18 x 24 (1 poster): this will probably be on the walls closer to the main entrance.

12. (Only for 11/30) Check with main office to see if they have anything for Anjali related to the survey.

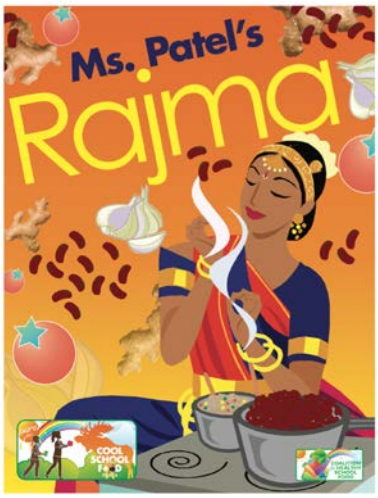
Thank you!

West African Beans & Greens:





Ms. Patel's Rajma:



Awesome Bean Burger:

GENERAL DATA SHEET

I. General Information.

Your name:

Date: **Arrival Time:** **Departure Time:**

School:

Number on first label of day: **Number on last label of day:**

II. Members of the Research Team - Name and Role.

1.
2.
3.
4.
5.
6.
7.

III. Back-up Plan Implemented? (i.e. when there are less than 3 people for data collection and/or less than 2 people for taste-testings) Circle all applicable.

A. If there **TWO data collectors** instead of three. One will do selection. One will do waste (just recorder, no caller).
    a. If there isn't enough time to collect all the trays, recorder can collect every other tray, or every 3rd (or 4th) tray.
    b. If there is no overlap between selection and waste, both data collectors can do selection and waste.
B. If there is just **ONE data collector** instead of three. That person will just do waste (recorder, no caller or selection).
    a. If there isn't enough time to collect all the trays, recorder can collect every other tray, or every 3rd (or 4th) tray.
C. If there is only **ONE taste tester** instead of two: that person will do the preparing, serving, cleaning up of the taste-tests.
D. N/A
E. Other (describe):

IV. Menu items of the day, possible abbreviations, and serving sizes.

You should list ALL items offered that day. This includes: entrees, hot and cold, including sandwiches; ALL items in salad bar (fruits, vegetables, toppings, etc); beverages (milk, water, juice); and anything else.

The list below includes standard options and the pre-determined Cool School Food and alternate entrées. There should be one Cool School Food entrée and one alternate entrée being offered on Thursdays. This is not an exhaustive list, and you can add your own items if they do not appear on the list below.

Please use the items on this list as they are written to prefill in the "Food Items" on your Data Sheets! All of these 15 items, plus or minus a few items should be on your data sheets every Thursday!.

1. Cool School Food Entrée – 2 options, only 1 option offered on Thursday
    a. **Ms. Patel's Rajma** OR
    b. **West African Beans & Greens**
2. Other hot entrée – 2 options, only 1 option offered on Thursday
    a. Toasted Cheese OR
    b. ?
3. **At least one fruit (varies)**
4. **At least one vegetable (varies)**
    a. "Salad"
        i. salad with multiple ingredients should still be coded as ONE item
5. Boiled Egg
6. PB & J
7. Bagel & cream cheese
8. Melted cheese bagel
9. Cold cut sandwiches - e.g. Turkey & Cheese, Ham & Cheese → can refer to all of these as "cold cut sandwich"
10. Chocolate milk (fat free)
11. Strawberry milk (fat free)
12. Skim milk (1%, plain)
13. Apple juice
14. Orange juice
15. Leftovers from day before (sometimes)

***On the data sheet,**

- **if you can't tell the difference between the different sandwiches (cold cut vs. PB&J), just *add* a row for "sandwich".**
- **If you can't tell the difference between the bagels (cream cheese vs. melted cheese), just *add* a row for "bagel".**

Item	***Serving Size (i.e. how much is in one serving in g)***	***Offered (Check for Yes; leave blank for No)***	***Other notes, i.e. description of item when it says "SPECIFY" in first column***
Ms. Patel's Rajma ("Rajma")			
West African Beans & Greens ("B&G")			
Toasted Cheese "TC"			
Alternate Hot Entrée			

Fruit 1 **(SPECIFY):**			
Fruit 2 **(SPECIFY):**			
Fruit 3 **(SPECIFY):**			
Vegetable 1 **(SPECIFY)**			
Vegetable 2 **(SPECIFY)**			
Vegetable 3 **(SPECIFY)**			
Milk – strawberry			
Milk – 1%			
Milk – chocolate			
Apple juice			
Orange juice			
Bagel w/ cream cheese			
Bagel w/ melted cheese			
PB&J			
Cold-cut sandwich (**SPECIFY**)			
Yogurt (**SPECIFY**)			
Boiled egg			

V. Observing Cafeteria Environment*

**IMPORTANT because these are relevant to the interventions!!! Please only follow sentences grayed out in the intervention period at the treatment schools.*

What are the fruits, vegetables, and salad served in? If in the intervention period, and they are not served in the more appealing serving containers selected for the intervention period, please ask food service staff where they are and to serve these items in those containers.

Are there CSF posters around the cafeteria? Where? If you can't see them, and are in the intervention period, ask staff where they went.

Is the CSF entrée the first entrée students encounter in the lunch line? Where is it located? (Diagram may be helpful) If not and in the intervention period, ask the food service staff to rearrange the entrees so that it is the first one offered.

Are there CSF signs at the serving line? Where? If you can't see them, and are in the intervention period, ask staff where they went.

Accuracy of CSF signs. Please circle one.

A. No CSF signs are hung.
B. The CSF sign(s) reflect CSF entrée(s) that are not being served on that day.
C. Only a generic CSF sign is hung, and no entrée -specific CSF sign is hung.
D. The CSF sign(s) on display reflect the same CSF entrée being served that day.
E. All or many CSF signs are on display, reflecting multiple CSF entrées.

VI. Time each grade actually enters and leaves (don't just fill in the times from the lunch period schedule). Grade options: K, 1, 2, 3, 4, 5

Grade	***Time in***	***Time out***

VII. Data collection method. Describe the sampling procedure used to record tray waste data in the case that not every tray was recorded, e.g. every other tray, every 3rd tray, etc.

VIII. Other notes (e.g. cafeteria layout and data collector positions, unusual events, emergencies, concerns, etc).

Page:

SELECTION DATA SHEET

Indicate with a check mark in the cell in the corresponding row if the food item was selected.
Each numbered column signifies one tray.
If there is no number on the tray, leave the corresponding cell for Tray Number empty.
If the student did not select the item listed, leave the corresponding cell empty.

Race:

W White
H Hispanic, Latino, Spanish
B Black or African-American
A Asian (excl. S. Asian)
S South Asian
O Other
U Unknown

Date: **School:** **Researcher Name:**

	Tray Number														
Grade (K, 1-5)															
Gender (M/F)															
Race (see legend)															
Food Item															

Page:

WASTE DATA SHEET

Indicate in the cell in the corresponding row the number of quarter-servings that REMAIN with 0, 1, 2, 3, or 4.
Each numbered column signifies one tray.
If there is no number of the tray, leave the corresponding cell for Tray Number empty, but continue to fill out the rest of the column.
If the student did not select the item listed, leave the corresponding cell empty.
If you can't tell whether an item was on the tray, leave cell blank. Only enter data for food you can identify.
In the case that you can't tell what was on the tray for the entire tray, fill in the Tray Number and leave the rest of the column blank.

0 None wasted
1 1/4 wasted
2 1/2 wasted
3 3/4 wasted
4 All wasted

REMEMBER: You are recording number of quarter servings WASTED, NOT CONSUMED.

Date: **School:** **Researcher Name:**

Tray Number

Grade (K, 1-5)																	
Food Item																	

APPENDIX D

Child Assent

We are doing a study to learn about children's eating habits and opinions of school lunch. We think you can help.

If you agree to be in our study, we are going to ask you some questions about what you eat and what you think about certain foods.

You can ask the teacher questions about this study at any time. If you decide at any time not to finish, you can ask the teacher to stop.

There are no right or wrong answers because this is not a test and this will not affect your grades. The answers you give will be kept private. No one will ever know what you say unless you tell them. Your name will never be used.

Continuing with this survey means that you have read this and that you want to be in the study. Being in the study is up to you, and no one will be upset if you don't want to be in it or if you change your mind later.

Please select below if you agree to the be to the study. If you don't want to be in the study, don't select below and please let the teacher know.

○ I agree to be in the study.

Section 1

Thank you for taking this survey! If you took this survey before, we are asking you a lot of the same questions as before because your answers might have changed. We are also asking you some new questions.

Before we start, if you took this survey before, you should have an index card with your ID number on the front and your name on the back of the card. Please type in that number below. It should be the same ID number you were given before, a few weeks ago.

If you did not take this survey before, please write your name on the back of the index card that has been given to you. The index card should have a number on the front of it. That number is your ID number for this study. Please type in your ID number below.

Please answer as honestly as you can. There are 40 questions.

SECTION 1

1. What elementary school do you go to?

- [C1]
- [T1]
- [T2]
- [C2]

2. What grade are you in?

- 3rd grade
- 5th grade

3. How old are you?

6 7 8 9 10 11 12

Years

4. Are you a boy or girl?

- Boy
- Girl
- Prefer not to answer

5. Which of the following best describes you? You may choose more than one answer.

- ☐ White
- ☐ Hispanic, Latino or Spanish origin
- ☐ Black or African American
- ☐ Asian (excluding South Asian)
- ☐ South Asian
- ☐ American Indian or Alaska Native
- ☐ Middle Eastern or North African
- ☐ Native Hawaiian or other Pacific Islander
- ☐ Other
- ☐ Prefer not to answer

6. How often do you get lunch at school?

- ○ Never
- ○ Some days I get lunch at school, other days I bring lunch.
- ○ Everyday

7. How happy are you with the food options you have at school lunch?

- ○ Very unhappy
- ○ Unhappy
- ○ In between
- ○ Happy
- ○ Very happy

8. How important is having healthy food to you?

- ○ Not important

- ○ A little important
- ○ In between
- ○ Important
- ○ Very important

9. How much do you like trying new foods?

- ○ Really don't like
- ○ Don't like
- ○ In between
- ○ Like
- ○ Love

10. Do you have any of the following dietary restrictions?

- ○ Vegetarian
- ○ Vegan
- ○ Gluten-free
- ○ Kosher
- ○ Halal
- ○ Lactose-intolerant
- ○ Sugar-free
- ○ Other
- ○ None

Section 2

SECTION 2

11. How much do you like eating fruits?

- » Really don't like
- » Don't like
- » In between
- » Like
- » Love

12. How often do you eat fruits?

- Never
- Some days I eat fruits, other days I don't eat any.
- In one meal a day
- In many meals a day

13. How much do you like eating vegetables?

- » Really don't like
- » Don't like
- » In between
- » Like
- » Love

14. How often do you eat vegetables?

- Never
- Some days I eat vegetables, other days I don't eat any.
- In one meal a day
- In many meals a day

15. How good for you is eating fruits and vegetables?

- Really bad
- Bad
- In between
- Good

- ○ Really good
- ○ I don't know.

16. How happy would your parents be if you were eating fruits and vegetables?

- ○ Very happy
- ○ Unhappy
- ○ In between
- ○ Happy
- ○ Very happy
- ○ I don't know.

17. Would your friends or classmates care if you were eating fruits and vegetables?

- ○ Yes
- ○ No
- ○ I don't know.

18. How much do you like eating beans?

- » Really don't like
- » Don't like
- » In between
- » Like
- » Love

19. How often do you eat beans?

- Never
- Some days I eat beans, other days I don't eat any.
- In one meal a day
- In many meals a day

Section 3

SECTION 3

20. Do you know what Cool School Food is?

- Yes
- Maybe
- No

Cool School Food recipes are plant-powered recipes from around the world you can try on Thursdays during school lunch.

21. How often do you eat Cool School Food?

- Never
- Some weeks I eat Cool School Food, other weeks I don't eat it.
- Once or more every week

22. How much do you like eating Cool School Food?

- Really don't like
- Don't like
- In between
- Like
- Love
- I have never tried it.

23. How much do you think other kids like eating Cool School Food?

- Really don't like
- Don't like
- In between
- Like
- Love
- They have never tried it.

24. How good for you is eating Cool School Food?

- » Really bad
- » Bad
- » In between
- » Good
- » Really good
- » I don't know.

25. Do you know what Ms. Patel's Rajma is?

- » Yes
- » Maybe
- » No

26. Ms. Patel's Rajma is a Cool School Food dish. It is an Indian curry made with kidney beans, tomatoes, onion, garlic, ginger and Indian spices.

How much do you like eating Ms. Patel's Rajma?

- » Really don't like
- » Don't like
- » In between
- » Like
- » Love
- » I have never tried it.

27. How often do you eat dishes similar to Ms. Patel's Rajma at home?

- Never
- Sometimes

- ○ Almost everyday
- ○ Everyday

28. Do you know what West African Beans & Greens is?

- ○ » Yes
- ○ » Maybe
- ○ » No

West African Beans & Greens is a Cool School Food dish. It has pinto beans, sweet potatoes, kale and ginger in it.

29. How much do you like eating West African Beans & Greens?

- ○ » Really don't like
- ○ » Don't like
- ○ » In between
- ○ » Like
- ○ » Love
- ○ » I have never tried it.

30. How often do you eat dishes similar to West African Beans & Greens at home?

- ○ Never
- ○ Sometimes
- ○ Almost everyday
- ○ Everyday

Section 4

SECTION 4

31. Did you notice the Cool School Food posters and signs of Ms. Patel's Rajma and West African Beans & Greens around the school?

- » Yes
- » Maybe
- » No

32. Do you remember the morning announcements made about Cool School Food?

- » Yes
- » Maybe
- » No

33. Did you notice the colorful bowls and trays used to hold fruits and vegetables at the lunch line?

- » Yes
- » Maybe
- » No

34. How much do you think the posters and signs made you want to try Ms. Patel's Rajma or West African Beans & Greens?

- A lot
- A little bit
- Not at all
- I don't know.

35. How much do you think the morning announcements made you want to try Cool School Food?

- » A lot
- » A little bit
- » Not at all
- » I don't know.

36. How much do you think putting fruits and vegetables in colorful bowls and trays made you want to eat them?

- » A lot
- » A little bit
- » Not at all
- » I don't know.

37. Did trying samples of Ms. Patel's Rajma make you want to eat it?

- Yes
- Maybe
- No
- I never tried a sample of Ms. Patel's Rajma.

38. Did trying samples of West African Beans & Greens make you want to eat it?

- Yes
- Maybe
- No
- I never tried a sample of West African Beans & Greens.

39. Which of the things below do you think made you want to eat Cool School Food the most in the last three weeks?

- Posters and signs

- ○ Morning announcements
- ○ Trying samples of Cool School Food dishes, like Ms. Patel's Rajma and West African Beans & Greens
- ○ None of these options made me want to eat Cool School Food.
- ○ I never tried Cool School Food.

40. (OPTIONAL) Is there anything else you think made you want to try Cool School Food or made you like Cool School Food?

End

You are done! Thank you for taking this survey.

APPENDIX E

Survey Administration Instructions

From: Anjali Narang, Principal Investigator
Cornell Institutional Review Board (IRB) Protocol #: 1709007464
Protocol Title: Using Behavioral Economics to Promote Healthy, Plant-based Options at School Lunch

Dear Teacher,

With your help, I would like to administer a pre-survey on **November 28** and a post-survey on **December 19** in class to all third and fifth graders. I am not administering the surveys to fourth graders by request of the [REFERENCE OMITTED TO PRESERVE ANONYMITY] School District.

I have a unique set of twenty-five random numbers for each classroom in the 3rd and 5th grades of each school that are to serve as students' ID numbers — these numbers will allow me to match the pre- and post-surveys to each individual anonymously. Included with this document, I have a spreadsheet for you to please fill out and index cards.

Both the pre-survey and the post-survey are administered through Qualtrics, and I have provided a link below.

Some parents have *opted-out* of taking the survey for their children. I have a list printed out with the names of the children whose parents have opted out for them for each school. Please refer to this list and make sure students in your class on this list do *not* take the pre-survey or the post-survey. Please note that this survey is voluntary, and the students might also opt out, as is instructed in the Child Assent form that precedes the survey.

I will share electronic versions of the spreadsheet, this document, and the names of children whose parents have opted out for them with you and/or the Principal or somebody at the main office.

It would be very helpful if you could please follow the instructions below. I have created a different set of instructions for the pre-survey vs. post-survey, though they are similar. You may contact me at aun2@cornell.edu or [mobile number deleted for privacy purposes] if you have any questions.

Thank you so much for administering these surveys! It is really appreciated. Have a great break!

Sincerely,

Anjali Narang
aun2@cornell.edu
[Mobile number deleted for privacy purposes]

PRE-SURVEY ADMINISTRATION

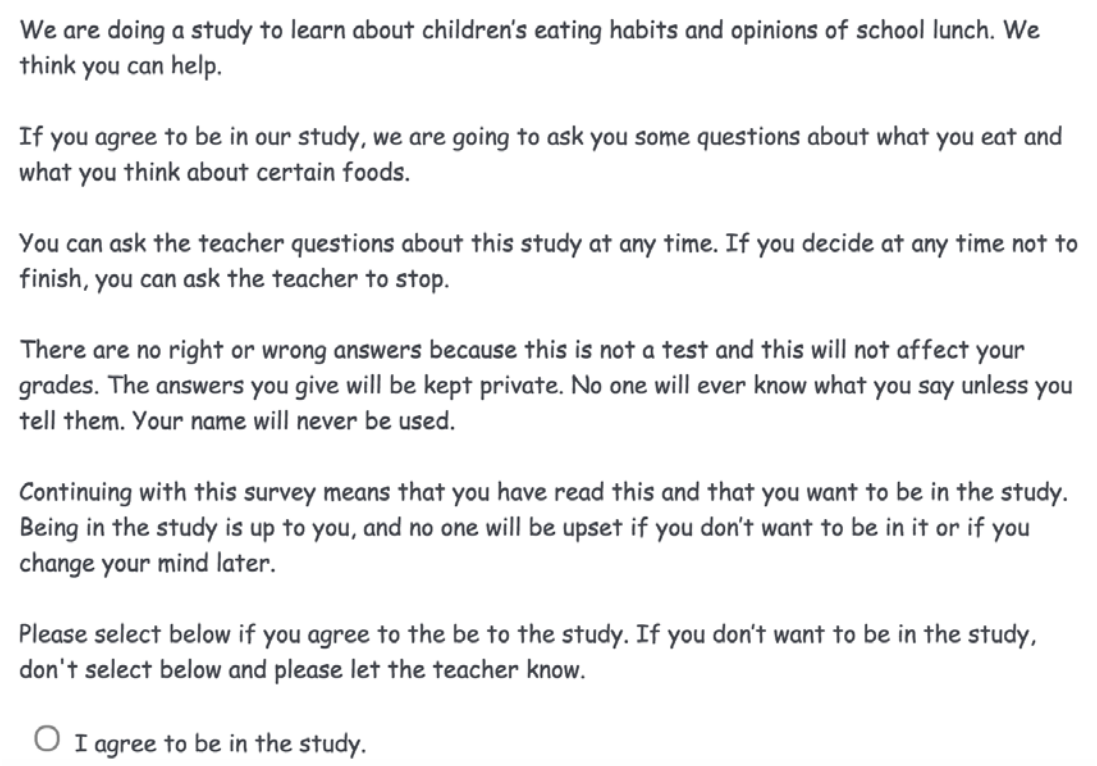
1. It would be greatly appreciated if you could please administer the survey sometime after lunch. This is to minimize the effect of timing on survey responses and also to make them more realistic. Since this survey is primarily about school lunch, it should be easier for students to respond accurately when lunch is still fresh in their mind.

2. Please provide students with the corresponding link to the Qualtrics survey so that they can take it electronically – there are different links for the pre- vs. post-survey.

(Nov 28) Pre-survey: https://cornell.qualtrics.com/jfe/form/SV_0qZk70wYQudggEB

3. There are index cards with ID numbers on the front of them. They are randomly ordered, and please distribute them only to students whose parents have not opted out for them in a random fashion. **Please refer to the opt-out list provided to you to ensure that these students don't take the survey.** The deadline for opting out was November 20, but if parents opt out afterwards, I will update the school. There are extra index cards/numbers that may left unused.

4. The first screen on the survey is the Child Assent form (see below) which tells the student about the study and that it is voluntary. Students may choose not to take the survey at this point, and I wrote on the form that they should tell their teacher if this is the case.



We are doing a study to learn about children's eating habits and opinions of school lunch. We think you can help.

If you agree to be in our study, we are going to ask you some questions about what you eat and what you think about certain foods.

You can ask the teacher questions about this study at any time. If you decide at any time not to finish, you can ask the teacher to stop.

There are no right or wrong answers because this is not a test and this will not affect your grades. The answers you give will be kept private. No one will ever know what you say unless you tell them. Your name will never be used.

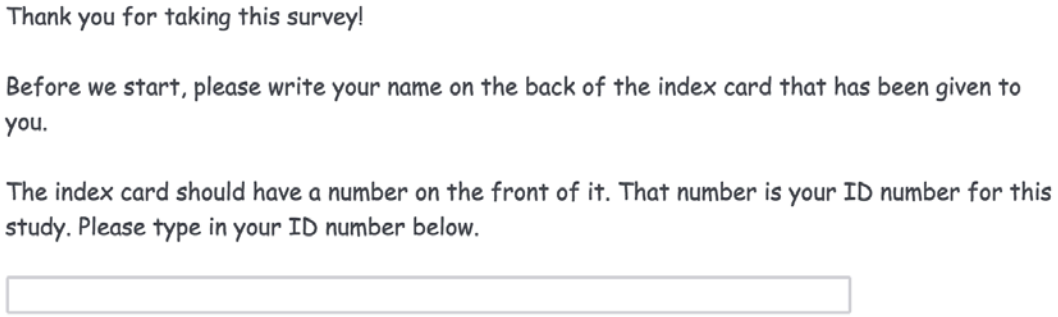
Continuing with this survey means that you have read this and that you want to be in the study. Being in the study is up to you, and no one will be upset if you don't want to be in it or if you change your mind later.

Please select below if you agree to the be to the study. If you don't want to be in the study, don't select below and please let the teacher know.

○ I agree to be in the study.

5. Students are asked to enter their ID number on the second screen.

Pre-survey


Thank you for taking this survey!

Before we start, please write your name on the back of the index card that has been given to you.

The index card should have a number on the front of it. That number is your ID number for this study. Please type in your ID number below.

AFTER ADMINISTERING PRE-SURVEY

6. After all the students have completed their surveys, please ask the students to make sure they have written their names on the back of the index card.

7. Please collect the index cards from all the students who took the survey, and check that they wrote their names on the backs.

8. Please complete the paper or electronic version of the spreadsheet template with the ID numbers. This template is for documentation purposes, and also as a back-up in case index cards get lost.
    a. Please write down the first and last name of each student who took the survey next to their ID number.
    b. Please also indicate whether they took the pre-survey with an "X" in the corresponding cell. This will help me later to confirm which surveys are unmatched.

9. As I am not supposed to have the names of the students, please make a copy of the spreadsheet without the "Last Name" and "First Name" columns after the pre-survey is administered on November 28. Please hand this deidentified copy to somebody at the main office, where I will come to pick them up likely later that day.

10. If you completed the paper version of the spreadsheet, please put it back in the envelope provided to you with the index cards. These index cards are to be saved, and given out to the students to take the post-survey with the same numbers.

Thank you so much again for your all help with my study!

POST-SURVEY ADMINISTRATION

1. To minimize the effect of timing on survey responses, it would be greatly appreciated if you could please
    a. administer the survey sometime after lunch. This will also make the survey responses more realistic. Since this survey is primarily about school lunch, it should be easier for students to respond accurately when lunch is still fresh in their mind.
    b. administer it on **December 19** if you administered the pre-survey on November 28 (both Tuesdays), or on **December 20** if you administered the pre-survey on November 29 (both Wednesdays). This will help minimize the effect of day of the week on survey responses. However, if this is not possible it would be okay for the post-survey to be taken either day, or even later that week.

2. Please provide students with the corresponding link to the Qualtrics survey so that they can take it electronically – there are different links for the pre- vs. post-survey.

(Dec 19/20) Post-Survey: https://tinyurl.com/csfpostsurvey

3. Please hand the index cards that were filled out during the pre-survey to the same student who had that card before – these students should have written their names already on the back of the card. You may also refer to the spreadsheet that you filled out that matched student names to ID numbers that should have recorded this information.

    If there are students in class who were not assigned an ID number for the pre-survey because they weren't there and their parents have not opted out for them, please hand him/her an unassigned index card with no name on it. Survey responses from students who did not take the pre-survey will still be helpful. There should be index cards/numbers that were not used for the pre-survey.

    Please refer to the opt-out list on the Google Doc to you to ensure that the students whose parents have opted-out for them don't take the survey.

4. The first screen on the survey is the Child Assent form (see page 3), which tells the student about the study and that it is voluntary. Students may choose not to take the survey at this point, and I wrote on the form that they should tell their teacher if this is the case.

5. Students are asked to enter their ID number on the second screen.

Post-survey:

Thank you for taking this survey! If you took this survey before, we are asking you a lot of the same questions as before because your answers might have changed. We are also asking you some new questions.

Before we start, if you took this survey before, you should have an index card with your ID number on the front and your name on the back of the card. Please type in that number below. It should be the same ID number you were given before, a few weeks ago.

If you did not take this survey before, please write your name on the back of the index card that has been given to you. The index card should have a number on the front of it. That number is your ID number for this study. Please type in your ID number below.

AFTER ADMINISTERING POST-SURVEY

11. After all the students have completed their surveys, please ask the students to make sure they have written their names on the back of the index card if they have not already.

12. Please collect the index cards from all the students who took the survey, and check that their names are on the backs.

13. **Creating Master List**. Please complete the paper or electronic version of the same spreadsheet template with the ID numbers you did for the pre-survey.
    a. Please write down the first and last name of each student who took either the pre-survey or the post-survey, or both, next to their ID number; you should already have names of those who took the pre-survey.
    b. Please indicate whether these students took the pre-survey and/or the post-survey with an "X" or checkmark in the corresponding cell.
    c. Sample below.

School:	Highland				
Teacher:	Glenn				
Grade:	3				
		Date	11/28/17	12/19/17	
ID Number	Last Name	First Name	Took Pre-Sur	Took Post-Survey?	
1	Chenier	Ara		X	
13	Mensch	Carolee	X	X	
15	Gosier	Barbara	X		
19	Macha	Margaret	X	X	
23	Ambrosino	Joselyn	X		
35					

14. **Creating Deidentified Master List**: As I am not supposed to have the names of the students, please make a deidentified copy of the spreadsheet without the "Last Name" and "First Name" columns. Sample below. This will help me confirm which surveys are unmatched, and if something has gone wrong with the collection of responses in

Qualtrics. Electronic copies would be preferable, because I will not be able to pick up paper copies handed in after December 20. You can email me the electronic copies at aun2@cornell.edu, or put them in the "Completed Spreadsheets" folder in the Google Drive folder with the survey materials. Or if you are able to hand in the paper copies on or before December 20, please hand them in to the main office by December 20 and I will pick them up.

School:	Highland				
Teacher:	Glenn				
Grade:	3				
		Date	11/28/17	12/19/17	
ID Number	Last Name	First Name	Took Pre-Sur	Took Post-Survey?	
1				X	
13			X	X	
15			X		
19			X	X	
23			X		
35					

15. Please put it back any materials with identifiable information in the envelope provided to you, such as index cards and your copies of the spreadsheet with student names and ID numbers. I will not collect these, but the school will have them for documentation purposes.

16. Please hand the envelope and the deidentified copy of the spreadsheet to somebody at the main office.

Thank you so much again for your all help with my study! I look forward to analyzing the results.